

Unveiling Vegetation Composition and Dynamics Along Urbanization Gradient in Ranchi, Eastern India

Authors : Purabi Saikia

Abstract : The present study was carried out across 84 vegetated grids (>10% vegetation cover) along an urbanization gradient, ranging from the urban core to peri-urban and natural vegetation in and around Ranchi, Eastern India, aiming to examine the phytosociological attributes by belt transect (167 transects each of 0.5 ha) method. Overall, plant species richness was highest in natural vegetation (242 spp.), followed by peri-urban (198 spp.) and urban (182 spp.). Similarly, H' , CD, E, Dmg, Dmn, and ENS showed significant differences in the tree layer (H' : 0.45-3.36; CD: 0.04-1.00; E: 0.25-0.96; Dmg: 0.18-7.15; Dmn: 0.03-4.24, and ENS: 1-29) in the entire urbanization gradient. Various α -diversity indices of the adult trees (H' : 3.98, Dmg: 14.32, Dmn: 2.38, ENS: 54) were comparatively better in urban vegetation compared to peri-urban (H' : 2.49, Dmg: 10.37, Dmn: 0.81, ENS: 12) and natural vegetation (H' : 2.89, Dmg: 13.46, Dmn: 0.85, ENS: 18). Tree communities have shown better response and adaptability in urban vegetation than shrubs and herbs. The prevalence of rare (41%), very rare (29%), and exotic species (39%) in urban vegetation may be due to the intentional introduction of a number of fast-growing exotic tree species in different social forestry plantations that have created a diverse and heterogeneous habitat. Despite contagious distribution, the majority of trees (36.14%) have shown no regeneration in the entire urbanization gradient. Additionally, a quite high percentage of IUCN red-listed plant species (51% and 178 spp.), including endangered (01 sp.), vulnerable (03 spp.), near threatened (04 spp.), least concern (163 spp.), and data deficient (07 spp.), warrant immediate policy interventions. Overall, the study witnessed subsequent transformations in floristic composition and structure from urban to natural vegetation in Eastern India. The outcomes are crucial for fostering resilient ecosystems, biodiversity conservation, and sustainable development in the region that supports diverse plant communities.

Keywords : floristic communities, urbanization gradients, exotic species, regeneration

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