IISER study highlights significance of hill slopes in maintaining green cover in Western Ghats

By Gayatri Vajpeyee Feb 05, 2025 09:20 AM IST

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Pune: A new study by the Indian Institute of Science Education and Research (IISER) highlighted that, the hill slopes in Western Ghats, which are highly threatened by encroachments, are playing crucial role in maintaining the green cover in western ghats in India. The study conducted in 25 Protected areas of Western Ghats revealed that uneven solar heating of slopes facing different directions creates better conditions for tree growth on north- and north-west facing slopes, and less favourable on south- and south-east facing slopes in the Western Ghats.

Known as a global biodiversity hotspot, the Western ghat Ghats traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat.

Climate Change, encroachments, change in agriculture pattern and proposed infra projects are among the significant threats for the Western Ghats in India.

In the recent paper titled 'Monsoonal climate and asymmetric heating facilitate the slope-aspect to influence landscape-scale tree structure in the Western Ghats, India,' IISER Pune researchers and collaborators examined vegetation in 25 protected areas along the Western Ghats and found a link between the direction of the slopes and tree cover, as well as canopy height. The researchers included PhD student Devi Maheshwori and faculty member Dr. Shreyas Managave from IISER Pune, Dr. Girish Jathar from Srushti Conservation Foundation; and independent GIS Consultant Sham Davande.

The research revealed two main patterns including north-facing slopes have higher tree cover and taller canopy height compared to south-facing slopes. Similarly, west-facing slopes have more tree cover and taller canopies than east-facing slopes. As a result, the northwest-facing slopes tend to have the highest tree cover and tallest canopy height, while southeast-facing slopes have the lowest. The researchers found these differences to be more pronounced on steeper slopes.

“Understanding the factors that influence tree growth in the Western Ghats is critical for both academic research and successful conservation and afforestation efforts,” said Dr. Shreyas Managave.

“While regional rainfall patterns are known to impact vegetation distribution at regional scale, this study is the first to demonstrate significant influence of slope direction at the landscape scale,” he added.

The study suggests that uneven solar heating of slopes facing different directions creates better conditions for tree growth on north- and north-west facing slopes, and less favourable on south- and south-east facing slopes in the Western Ghats. This research paper highlights the importance of considering slope direction when planning biodiversity assessments, protecting endemic species, or increasing tree cover in the Western Ghats.

The WG is an ecologically sensitive zone with high biodiversity and species endemicity. The influence of slope-aspect on controlling tree cover and canopy height at the landscape-scale in the WG revealed is important not only for academic research but also for the effective implementation of afforestation programs and the conservation of biodiversity. Biodiversity assessment studies in the WG should consider the slope-aspect effect as an additional framework while assessing species distribution at the landscape scale.

There is a need to acknowledge the tendency of the S- and SE-aspects to have a lower TC and CH as a natural phenomenon, relatively less favourable conditions for tree growth on them should be considered while designing afforestation programs in the WG, states the paper.

Source:

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