

SIKKIM'S HIGHEST FOREST ZONE COULD GET DENSER

Relevant for: Environment & Disaster Management | Topic: Environmental Degradation - GHGs, Ozone Depletion & Climate Change

A view of the timberline in Sikkim's Khangchendzonga National Park. | Photo Credit: [Team Badola](#)

The cold climates on high-altitude mountain tops make it usually difficult for trees to grow above the timberline (the last canopy forests on the mountains). Though global warming is changing this in many of the world's high mountains and causing timberlines to move upward, the eastern Himalaya may be an exception, find scientists. The zone of uppermost canopy forests here are unlikely to shift upwards but will get denser, suggests a study in *PLOS ONE*.

Timberlines, the uppermost limit of canopy forests that gradually gives way to the treeline (beyond which trees do not grow) are limited by climate: factors including low temperatures and high winds on mountain tops prevent woody tree growth higher up. Timberlines, therefore, serve as indicators of climate change. To find out if a similar pattern exists in the eastern Himalaya, scientists from institutes including Sikkim's G. B. Pant National Institute of Himalayan Environment and Sustainable Development studied the composition and regeneration of woody trees in the timberline ecotone (transition zone) between the timberline and treeline, of Khangchendzonga National Park.

Across nine contiguous sites in the Park, the team studied tree composition in this ecotone which lay between 3,787 and 3,989 metres above sea level. Among the 20 woody tree species they recorded here, the Bhutan fir *Abies densa*, the woolly rhododendron *Rhododendron lanatum* and the small-leaf rowan *Sorbus microphylla* dominated the vegetation. Environmental factors such as elevation, slope and humus played a role in this species composition. The density of trees in the timberline ecotone was significantly higher than that of its western Himalayan counterparts.

To study regeneration of the dominant timberline species in the ecotone, the researchers recorded seedlings, saplings and trees in this zone. Bhutan fir seedlings regenerated well here and elevation (along with humus and slope) played a role in this regeneration too. The zone contained high numbers of seedlings and saplings. According to the authors, this indicates that the ecotone could become denser in the near future. However, there were no tree seedlings or saplings beyond the treeline.

"This suggests that though the timberline is unlikely to shift, it could get denser in the near future," said lead author of the study, Dr. Hemant Badola, currently advisor to Sikkim Chief Minister's Office. It would be crucial to study the timberlines in more detail to understand how these sensitive areas respond to climate change, he added.

With the increase in anthropogenic activities like trade and transport, the biogeographical borders are broken down

END