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Future warming shifts climatic suitability of native Himalayan tree species

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Statement of the Problem: Climate change (CC) issue attracts attention of global community since the last couple of decades due to its detrimental consequences on social and ecological sectors. CC impacts are forecasted to disrupt most of the global ecosystems, with high altitude regions to become a worst sufferer. Mountains of such elevated regions are fragile ecosystem, and are subject to high impacts from the projected CC, that could affect distribution of existing native vegetation resulted from future unsuitable climate. As a result, vegetation can migrate or shift into areas having climate they can fully tolerate to maintain their growth and survival. The purpose of this study is to model nine native highland plants viz. *Abies spectabilis, Betula utilis, Quercus semecarpifolia, Juniperus indica, Tsuga dumosa, Acer campbellii, Rohododendron campanulatum, Ephedra gerardiana, cassiope fastigiata* so as to visualize the likely landscape of the Himalaya under future warming climate. Methodology & Theoretical Orientation: Analysis was done using CLIMEX niche modeling technique. Two global climate models, CSIRO-MK 3.0 (CS) and MIROCH-H (MR) were used under IPCC A1B and A2 emission scenarios for the year 2050 and 2100. Findings: Climatic suitability of the nine species contracts in areas that are currently suitable while expands in areas that are currently unsuitable. Currently around 1.09 million sq. km. area is climatically suitable. An addition of 0.68 and 0.35 million sq. km. will become suitable by 2050 and 2100 respectively. Cold stress is the main limiting factor for overall expansion of climatic suitability in the region. Conclusion & Significance: Existing climatic suitability of the nine high land native species will substantially shift towards north in the Tibetan Plateau. Such climatic suitability shift could impacts existing nature conservation activities and availability of water and food security in the region. Formulation and implementation of suitable adaptation strategies is necessary to offset such negative implications.

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