# Is the future of oak (*Quercus* spp.) forests safe in the Western Himalayas?

The genus *Quercus* (oak) is a large group of hardwood trees with about 600 species worldwide[1]. In the Himalayan region, extensive oak forests (35 species) occur between 1500 and 3300 m elevations. Five species of evergreen oaks, viz. *Quercus glauca* (*phaliyant*/*harinj*), *Quercus leucotrichophora* (*banj*), *Quercus floribunda* (*tilonj*/*moru*), *Quercus lanuginosa* (*rianj*) and *Quercus semecarpifolia* (*kharsu*) grow naturally in the Western Himalayas and each species is replaced by the other to form the climax community along the increasing altitude. At 2000 m and less *Q. leucotrichophora* exhibits 80% dominance (based on relative basal area), between 2000 and 2200 m it may share dominance with *Q. floribunda* and above this it generally disappears. In small patches between 2100 and 2400 m, *Q. floribunda* may show clear-cut dominance but with further increase in elevation, it is replaced by *Q. semecarpifolia*, which may show more than 70–80% dominance above 2600 m asl. These species assume considerable conservation significance in the region as they provide numerous ecosystem services and serve as a lifeline for the local communities.

The Himalayas are home to many unique and diverse human groups, living in the river valleys and mountain slopes, and differing from each other in terms of language, culture, tradition, religion and patterns of resource use. They have been subsisting on the Himalayan natural resources for thousands of years. However, with better access to the global market and demands of socio-economic development, local people's dependence on natural resources has increased in recent years. A major challenge for resource managers is the conflict between forests and locals, owing to the gradual 'degradation' of forests and increase in demand for fodder. Using available research data, foresters have assumed that the cause of forest degradation is largely due to the villagers' practice of cutting branches of oaks. It is also observed that oaks in the accessible Government forests have been mutilated by continuous lopping such that they are rapidly dying out.

Of the various species of oaks, the white oak or banj (*Q. leucotrichophora*) forms an extensive belt along the middle elevation (1200–2200 m) facing excessive pressure for existence. This belt is also inhabited by most of the agro-pastoral communities in the Western Himalayas. A review of the literature reveals that very few patches of intact oak forests are present in the region today and the remaining intact patches are also changing rapidly due to invasion by alien invasive species, such as *Eupatorium adenophorum*, *Lantana camara* and more aggressive species such as chir pine (*Pinus roxburghii*). The replacement of oak by pine has become a common and ever-increasing phenomenon[2]. Steady increase in human population, over-exploitation of natural resources, extensive clearing of forests for developmental activity, widespread logging/lopping and grazing have been responsible for the loss of oak forests in the region. Other than these pressures, oak forests in many parts of the Western Himalayas and in the rest of the world are dwindling due to lack of regeneration, habitat changes and biological invasions. The causes of failure in regeneration include lack of viable seeds due to insect and animal predation, unfavourable micro-sites and overgrazing by domestic livestock. Other reasons for dwindling of oak forests are erratic seed production, defoliation, acorn predation and increased incidences of fire.

Conservation of these valuable species would not be possible without the active participation of the local communities. By improving their living standards and giving benefits of conservation to them, long-term conservation goals can be achieved. To improve the understanding of ecosystem functions and processes, to develop a holistic description of the landscape, both intensive studies on small areas and assessment of much larger areas are required.

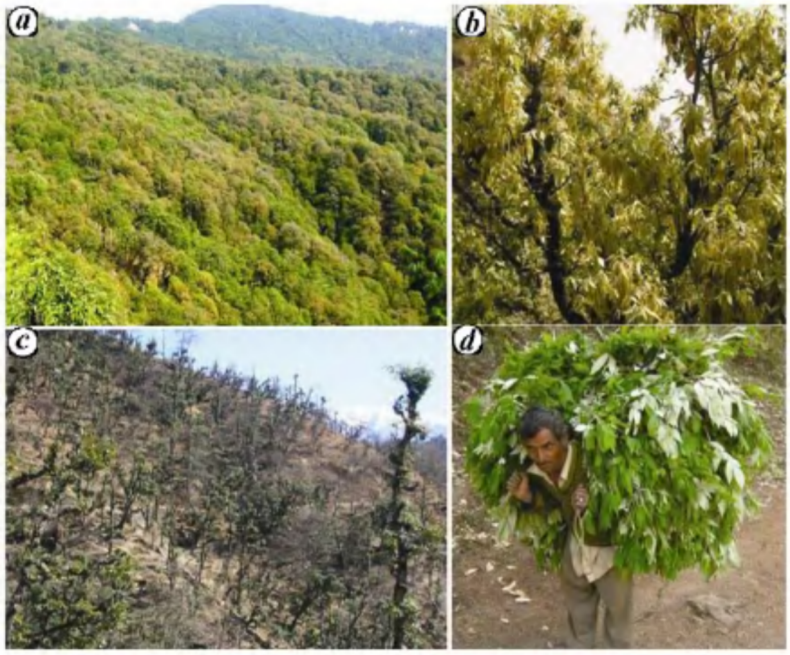


**Figure 1.** ***a***, Himalayan dense oak forests; ***b***, Flowering *Quercus leucotrichophora* tree; ***c***, Degrading oak forests; ***d***, Collection of oaks for fodder.

1. Soepadmo, E., *Ann. Missouri Bot. Gard.*, 1972, **73**, 228–275.
2. Singh, J. S., Rawat, Y. S. and Chaturvedi, O. P., *Nature*, 1984, **311**, 54–56.

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