

## Nature's richest biodiversity tampered with in Tirumala Hills

The Tirumala Hills in Andhra Pradesh is located 3200 ft (980 m) amsl, spread over 26.8 sq. km. It is a part of the Seshachala range of the Eastern Ghats consisting of seven peaks (hills), with beautiful overlapped structure. The hill range is endowed with dense vegetation and a large variety of flora and fauna. The terrain is hilly with steep slopes, deep gorges and rich floristic wealth of 1,500 species, belonging to 175 families, including many endemic species such as 'anduga' (*Boewellia ovelifolia*), 'mogi' (*Syzygium alternerifolia*), 'karaka' (*Terminalia pallida*), 'preetha' (*Cycas beddomei*). The area is also famous for red sanders and sandalwood and is considered a botanist's paradise, attracting students, teachers and researchers from all over India to study biodiversity.

The area originally contained a small village, with the famous temple surrounded by green thick vegetation and a forest range. The mean annual rainfall was 1,155 mm and mean temperature 27.5°C. During the past 3–4 decades, the scenario at Tirumala Hills has changed rapidly, with indiscriminate development programmes that have transformed the hill range, as the authorities embarked on construction activities, perhaps beyond optimum/permissible limits. Construc-

tion of multi-storied buildings mercilessly replaced the dense vegetation around the temple, which had earlier provided a wonderful backdrop to the temple towers in earlier years. Large land areas with amazing topography had to give space for guest houses and hotels with modern amenities. How many gigantic trees were felled and how much depth of soil was excavated will be anybody's guess. Indeed irreparable damage has been done to valuable biodiversity and the entire hill ecosystem.

However, attempts were made to retrieve the situation through a massive afforestation programme called 'Haritha'. A paper on this was submitted by P. Krishnaiah and V. Venkataramaiah to the XII World Forestry Congress in 2003 held in Quebec, Canada. It was reported that due to the implementation of the project, the dense forest area increased by 5.23%, moderate forest area by 4.74%, but the sparse forest area decreased by 61.89%. However, this improvement has been nullified with new construction activities undertaken in later years, suggesting that biodiversity could hardly be restored to its prime position. Although the beautification of the hills with impressive flower gardens and many parks has been undertaken, the irreparable

damage done to the original biodiversity remains unchallengeable.

A brief analysis of the ecosystem of Tirumala Hills reveals visible impacts due to human activities – (i) Destruction of the forest cover (by felling of trees or forest fire) could be a cause of declining rainfall. It is also affecting the animals inhabiting this area. (ii) The flora and fauna are being affected due to increasing vehicular traffic and the emissions from them. (iii) Concretization of roads has restricted percolation of rainwater into the soil; hence the groundwater has dropped and the region is struggling with water scarcity. (iv) Excavation of soil for construction is affecting the soil microbial biodiversity. This could also impose a threat to the new buildings. (v) Trees endemic to this area have been plundered for their high commercial value.

To sum up, due to indiscriminate human interference, the area once known for its scenic beauty has been tampered with.

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## Conservation of bats

Mahato *et al.*<sup>1</sup> have stated that the Indian flying fox (*Pteropus giganteus*) is listed as 'Least Concern' species by the IUCN Red data book<sup>2</sup> and that these bats are distributed in South Asia<sup>3</sup> including India. Their concern for protecting the bat colony is appreciated as abundance is not the criteria for crucifying innocent bats, which are doing useful ecosystem services like pollination and seeds dispersal<sup>4,5</sup>.

The authors have regretted that bats and small mammals are given priority for conservation in most parts of the world except India suggesting the paucity of research on status assessment and conservation of bat populations. This is not true, especially for Indian flying fox. Zoo Outreach Organization, Coimbatore is

involved in the conservation of bats in India and South Asia and is running a project called PteroCount<sup>6</sup> to study the abundance and roosts used by flying foxes in India. This organization is also publishing a newsletter called *Bat Net* mainly for bat conservationists and bat lovers. Researchers in the Department of Animal Behaviour and Physiology, Madurai Kamaraj University are working on the behaviour studies and conservation measures of bats. Forest officials of South India are also showing concern for the conservation of bats by placing notice boards at important bat roosting sites to prevent public disturbance (Figure 1). Presently country demarcation is not a barrier for able scientists who can generate funds worldwide.

Even though the primary habitat of *P. giganteus* is forest area, they are well



**Figure 1.** A notice board by Forest Department for protecting the nearby roosting flying foxes in Srivaikundam, Tamil Nadu.



**Figure 2.** *Pteropus giganteus* on a tree branch.

adapted to human habitation. In Tamil Nadu we observed ca. 20 colonies of these bat roosting in the trees on roadside and the bats are well accustomed to the din of vehicular movement. Flying foxes usually have wide foraging area ranging from 20 to 50 km (ref. 7). Figure 1 in

Mahato *et al.*<sup>1</sup> is not the Indian flying fox *P. giganteus* (Figure 2), but a medium-sized fruit bat, *Rousettus* sp. or *Cynopterus* sp., which is not a flying fox. This error in the identity of the species is to be corrected. *Prosopis juliflora* is one of the food plants of *Cynopterus sphinx*<sup>8</sup>. The flying fox *P. giganteus* mostly roost in the canopy of large trees and cutting these trees surely poses a threat to the roosting colony of bats and the absence of bats will surely affect the beauty of Hamirsir Lake.

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## Test exams and limitless human mind

Sangode<sup>1</sup> highlighted numerous entrance exams imposed by UGC (NET, SLET, SET, GATE) that one needs to qualify to register for a Ph D in the Indian universities<sup>2</sup>. It is likely that these preliminary examinations may help eliminate academically weak students, but may curb original thinking.

Qualifying in these examinations should not be the stand-alone criterion for selecting candidates. Zare<sup>3</sup> notes that in India much emphasis is placed on the number of publications as opposed to the quality and originality of the work in assessing the value of an individual

researcher. Sangode<sup>1</sup> argues that merely passing the entrance exams does not test the ability of a researcher to generate original and quality data.

I believe Indian science lacks original thinking and to address this problem, a rigorous training at the school level is required. The history of science provides several examples of eminent personalities who have been free thinkers. For example, Kalman Vanky, a Romanian physician and author of *Smut Fungi of the World*, developed a keen interest in the study of smut fungi, after attending a lecture on it. He initially studied them as

a hobby, but later went on to write monographs (six volumes) on the subject.

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