Sacred mountains: their ecological importance

While a good deal of literature is available on the sacred groves, their montane counterpart (pavitra parbats) have received scant attention. The question: Is it because the venerable deities are installed on the hilltops that the mountains are considered sacred, or realizing the essential ecosystem services rendered by the elevated surfaces of the planet that the temples were constructed on the mountain summits?

In India, there are several shrines from Kedarnath in the north to Tirupati Tirumala in the south, from Girnar in the west to Parasnath in the east. However, these are not only temples on the hilltops that attract devotees in thousands. In the Biligirirangan hills of Karnataka, the centuries-old Michaelia (Dodda Sampige) tree is held sacred and worshippers undertake an arduous journey on foot to offer prayers. Legend has it that the flames emanating from the natural gas stored underground in an Iranian mountain made the Zoroastrians consider the fire as a sacred element.

The ecological contribution of the mountains, sacred or otherwise, is substantial. As the plains are largely cultivated and occupied by human habitations, the forest and the biodiversity are mainly confined to the hilly regions. The sanctity attached to the objects of veneration provides the motive for the conservation of the ecosystem.

Mountains by themselves are a source of rainfall (orographic rains), not to speak of the convectional rains generated by the forest cover on the hills[1,2]. Besides, the organic debris and pollen grains floating over a dense forest serve as effective condensation nuclei[3]. A drastic effect of deforestation is felt at the level of micro/eco-climate. For example, in the hills around Kodaikanal, the shola (montane forest) canopy prevents frost from settling at the ground level, but in the open grasslands the ground temperature reaches below 0°C in winter and the frost kills the seedlings of the Shola species that may have germinated during favourable periods. Again during prevalence of dry spells, low humidity in the open spaces allows fires to spread to the grasslands, once again destroying the shola seedlings. Thus once cleared, the Shola species find it difficult to re-establish themselves in the grasslands.

Vegetation on the hill slopes checks soil erosion and prevents landslides. The flow of water rushing down the steep slopes carrying soil particles is reduced by the green mantle. The humus-rich soil under forest acts as a sponge soaking up water, preventing momentary floods. Gradually releasing the stored water, it feeds the perennial streams. The source of the rivers thus lies in the mountains. The melt-water from the Himalayan snow and glaciers feeds the Indo-Gangetic Plains. Major rivers of the peninsula originate in the Western Ghats.

However, montane ecosystem is sensitive to disturbances and undue anthropogenic pressure leads to landslides and other disasters.

1. Meher-Homji, V. M., In *Global Warming and Climate Change. Perspective from Developing Countries* (eds Gupta, S. and Pachauri, R. K.), TERI, New Delhi, 1989.
2. Meher-Homji, V. M., *Climate Change*, 1991, **19**, 163–173.
3. Glantz, M., *La Secheresse en Afrique*, Pour la Science Aout, 1987, pp. 18–25.

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Buried river channels

The Marine and Coastal Survey Division of the Geological Survey of India, Mangalore, has recently carried out shallow seismic survey off Ponnani, Kerala in order to understand the disposition of Bharathapuzha river channels during the geological past. The survey was carried out on the basis of data collected during the single line coast parallel reconnaissance shallow seismic survey which had brought out signatures of river channels at 50 m water depth off Ponnani. During the present study, close interval coast parallel shallow seismic survey was carried out between 8 and 38 m water depth.

During the Last Glacial Maximum, the sea was 120 m below the present sea level and in the subsequent years, sea level rose to the present level. It is deduced that the river must have flown through the present-day sea areas to reach the low sea levels of the geological past.

From the present study, it has been identified that two sets of river channels are buried under the sea, one in the offshore area of present-day Bharathapuzha river mouth and the other 6 km south of present-day mouth.

Seismograph section clearly indicates that channel depth ranges between 8 and 29 m. The occurrence of fluvial sand collected by vibrocoring also confirms that the signatures are indeed those of buried channels. It also propounds that the Bharathapuzha river must have made a course shift from the south almost 6 km to debouch to the Arabian Sea through the present-day mouth.

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