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Eravikolam and the High Range (Keralda/India)

Ecology and Landscape in an Isolated Indian National Park

Photos: Ian Lockwood

The southern Indian state of Kerala has long been recognized for its remarkable human development indicators. It has the country's highest literary rates, lowest infant mortality rates and highest life expectancy. With 819 people per km^2 Kerala is also one of the densest populated states in India. It is thus surprising to find one of the India's loneliest and least disturbed natural landscapes in the mountainous region of Kerala known as the High Range. Here a small 97 km^2 National Park called Eravikulam gives a timeless sense of the Western Ghats before the widespread encroachment of plantation agriculture, hydro-electric schemes, mining and human settlements.

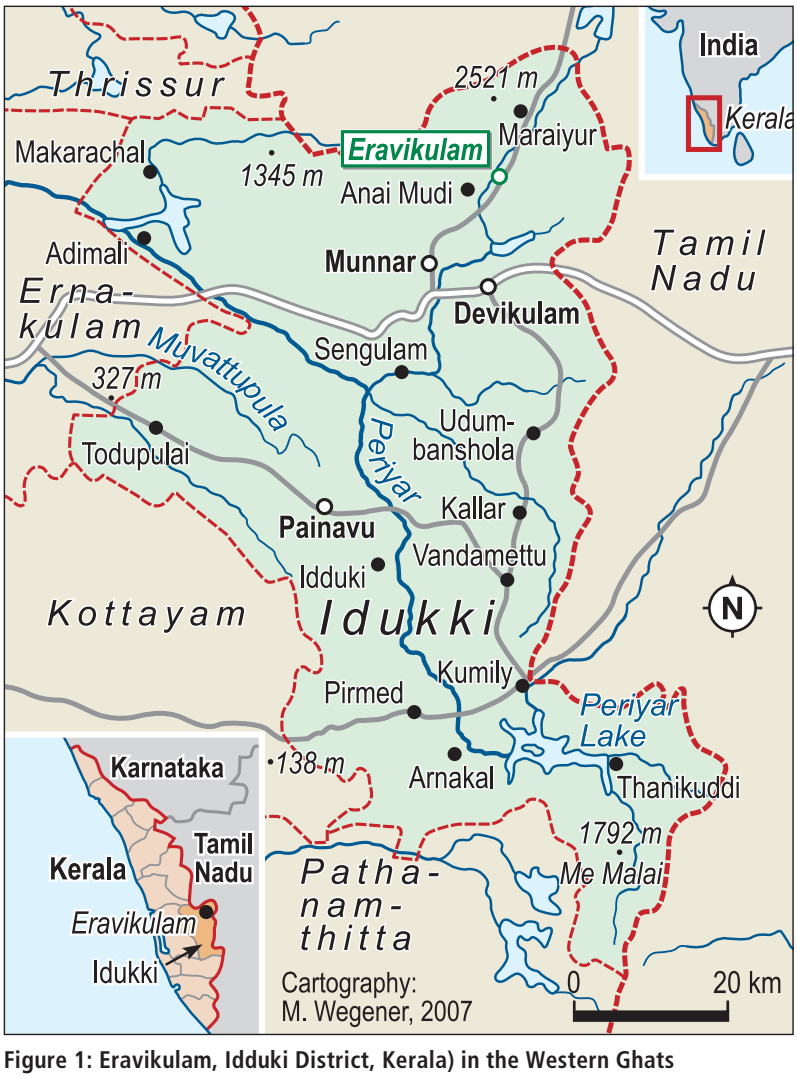
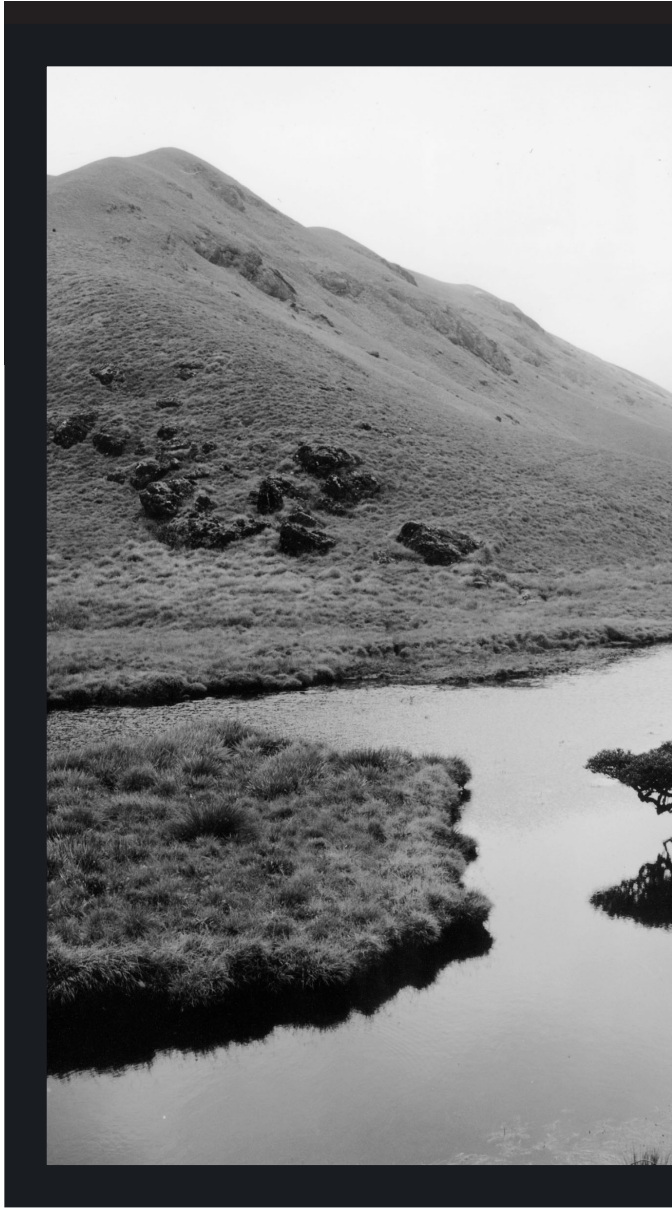


Figure 1: Eravikulam, Idduki District, Kerala) in the Western Ghats



The High Range is a part of the Western Ghats, a heterogeneous chain of mountains and hills that separate the moist Malabar and Konkan Coasts from the semi-arid interiors of the Dekhan plateau. They play a key role in directing the South Western monsoon and providing water to the plateau and the coastal plains. Starting at the southern tip of India at Kanyakumari (Cape Comorin), the mountains rise abruptly from the sea and plains. The Western Ghats continue in a nearly unbroken 1,600 km mountainous spine and end at the Tapi River on the border between Maharashtra and Gujarat. Biologically rich, the Western Ghats are blessed with high rates of endemism. In recent years as a global alarm has sounded on declining biodiversity, the Western Ghats and Sri Lanka have been designated as one of 25 "Global Biodiversity Hotspots" by Conservation International.

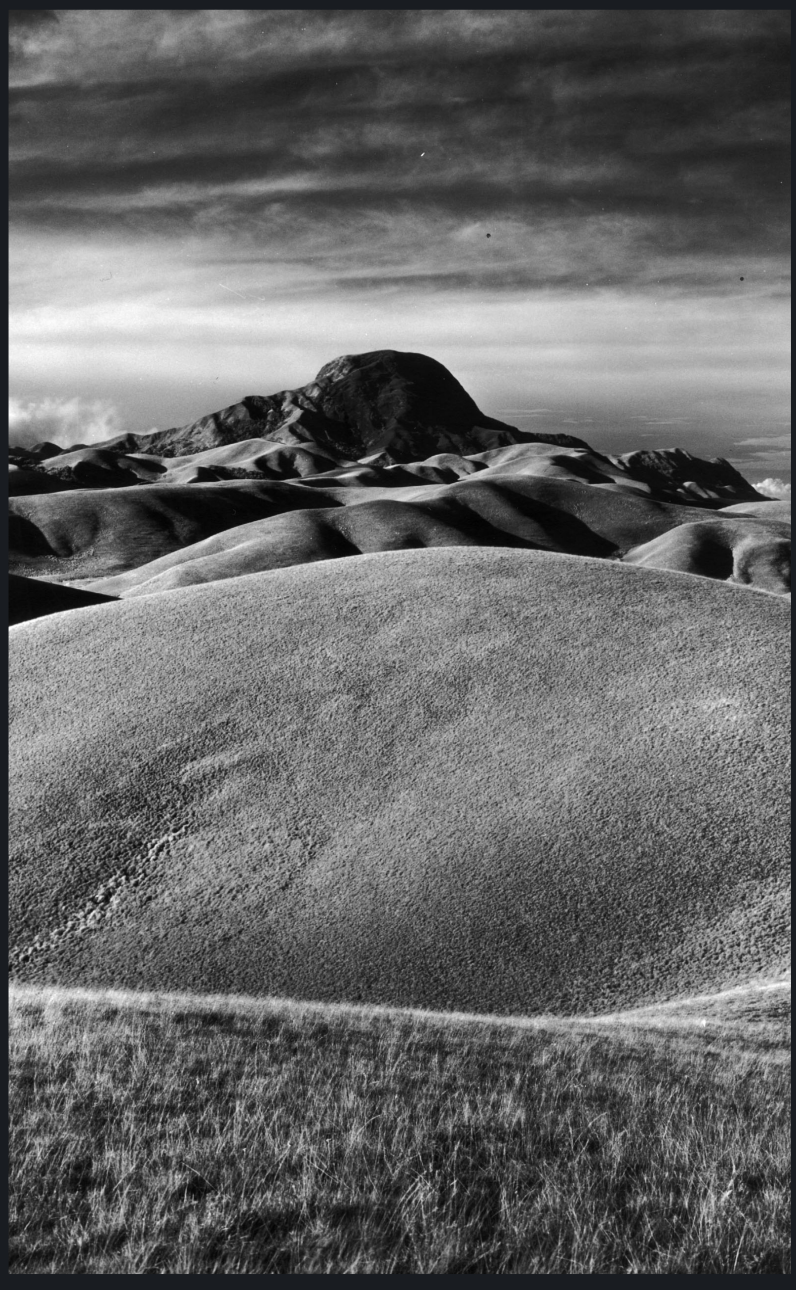
The High Range is part of the southern Western Ghats sub-region and is contiguous with the Palni, Anaimalai and Cardamom hills. Like the other hills ranges of the southern Western Ghats and Sri Lanka, the High Range is composed of very old granite horsts that were uplifted in Pre-Cambrian times. Several lofty plateaus of undulating hills guarded by fearsome cliffs and escarpments characterize the High Range landscape. Rainfall varies depending on proximity to the

➢ **Photo 1: Anai Mudi "Moonscape"**

Looking south to Anai Mudi, from the central part of Eravikulam National Park's "core zone." With 2,695 m Anai Mudi is the highest mountain in peninsular India south of the Himalaya. The peak's name is derived from the Tamil word Anai or elephant. The park continues to be crisscrossed by trails made by elephants and their dropping can be found just below the peak's summit.

➢ **Photo 2: Stream in the heart of Eravikulam**

A stream weaves it way through natural grasslands in the upper plateau of Eravikulam National Park. The tree here (not identified) is a shola species that has survived winter frost and seasonal fires. These streams are an important perennial water source for the far and distant lower plains in the eastern rain shadow of the Western Ghats. Conservationists have effectively used the critical issue of water supply to fend off development and forest plantation threats to this plateau.



western coast and averages about 3,000 mm a year (Eravikulam management). In some of the western areas of the High Range it can be as high as 6,000 mm, making it amongst the wettest locations on the Indian subcontinent.

Eravikulam National Park is located on the largest of these tablelands (between 10°09' and 10°20' North and 77°01' and 77°10' East). A dominant feature of the park is Anai Mudi Peak (2,695 m, *Photo 1*), India's highest peak south of the Himalaya. It lies on the southern border of the park and its wind swept summit is clearly visible from the lower tea estates that surround the south-eastern borders of Eravikulam.

Tea and conservation

The High Range is well known for the extensive tea plantations that carpet the valleys and surround the small but expanding settlement of Munnar. Tea, in fact, has played a decisive role in the protection of Eravikulam and its designation as a National Park. In colonial times when British planters and Tamil laborers were

➢ Photo 3: Nilgiri Tahr on hillside

A large herd of the endemic Nilgiri tahr (Hemitragus hylocrius) on a hillside near the tourist zone in the southern edge of the park. This agile mountain goat lives on montane grasslands and uses the steep cliff sides to evade predators. It closest relative is the Himalayan tahr (Hemitragus jemlahicus) found more than 2,000 kilometers away. Eravikulam hosts an estimated 50 % of the surviving 2500 wild Nilgiri tahr and provides their most secure home.

➢ Photo 4: Shola interior

Shola forests are montane (above 1,500–1,800 m) evergreen tropical forests that are unique to the high altitude regions of the Western Ghats. Stunted by fierce monsoon winds, sholas contain a wealth of plant and animal species. The shola/grasslands mosaic is the dominant vegetation type in Eravikulam and the park hosts the least disturbed surviving example in the entire Western Ghats. The shola/grasslands ecosystem plays a key role in absorbing monsoon rains and supplying the thirsty plains with a perennial source of water. Sholas are most often found in the protected folds of hills. They can be small clumps are larger expansive forests that cover several square kilometers.

clearing lower valleys of montane forest they left the higher plateaus alone. The plateaus have relatively poor soil and experience extremely wet and windy conditions during the monsoon, thus making them unsuitable for tea cultivation. Instead the plateaus were set aside as private game reserves where controlled hunting was allowed for the privileged classes. What is now Eravikulam was the largest and most significant of at least three different plateaus. Similar plateaus in the Palni and Nilgiri Hills were developed for hill stations and non-native fuel wood plantations, so it is remarkable that part of the High Range escaped this ecologically disastrous fate.

Development in the high mountainous areas of what was then known as Travancore State was quite limited before the advent of British colonialism and plantation agriculture in the mid 19th Century. An early account by the survey-

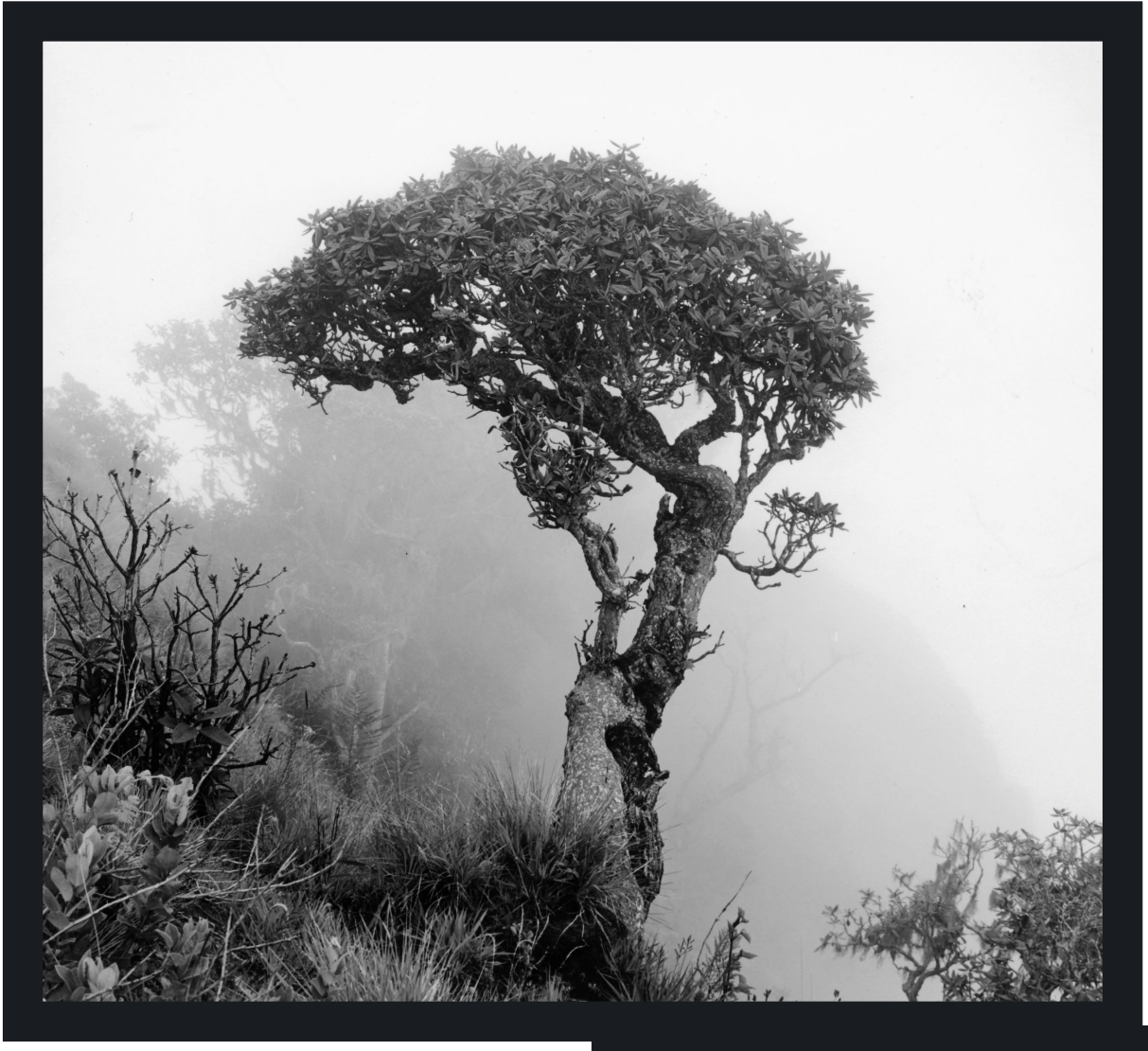


Photo 5: Rhododendron tree on grasslands escarpment (Rhododendron arbroreum nilagiricum)

The Western Ghats host a number of endemic species of plants and animals. Several of these have distant Himalayan cousins, like this endemic Rhododendron tree. Although it is a distinct species, it has close relatives in the Himalayas, as well as Sri Lanka! This suggests a very ancient bio-geographical link between the Himalaya, the Western Ghats and Sri Lanka. Scientists believe that the species once extended all the way from the Himalaya through peninsular India to Sri Lanka. Changing climate and geological conditions have now isolated these populations in the cooler higher reaches of the Western Ghats and Sri Lanka's Central Highlands. This species of Rhododendron tree grows on high altitude grassy slopes (above 1,800 m) in the southern Western Ghats.

or *Douglas Hamilton* succinctly captures the sense of wilderness that the High Ranges presented. In "A Record of Sport in Southern India" (1892) Hamilton provides one of the most evocative descriptions of the undisturbed high altitude plateau areas of the Western Ghats:

"The views from this mountain are the grandest and most extensive that I have ever beheld; some of the precipices are of stupendous magnitude and the charming variety of scenery, comprising undulating grassy hills, wooded valleys, rocky crags, overhanging precipices, the green fields in the Valley of Ungeenad (Mayayur Valley), the grand mass of the Pulnies beyond and the blue ranges (Nilgiris Hills) in the far distance present a view beyond my power to describe and must be seen to be appreciated; in a word the scenery in the Annumallays is surpassingly grand and incomparably beautiful. On our way to the Kartu Mullay (the second highest peak in Eravikulam) we disturbed several herds of ibex (Nilgiri Tahr), which as they bounded amongst the crags and precipices, added greatly to the effects of the grand and wild features of the country we were passing though."

Tea was introduced in the High Range in the late 19th Century. It soon became an important cash crop that drove the economy of the whole region. By the time of independence large tea estates had carved out most of the lower montane rainforests to replace them with sprawling estates. Large tea estates under the Finlay and later Tata Tea companies controlled Eravikulam until 1971 when it was taken over by the State of Kerala. It was notified as a wildlife sanctuary in 1975 and subsequently became a National Park in 1978.

National Parks, along with Tiger Reserves, are awarded the highest level of protection in India and Eravikulam was only the second park to be designated in the state. Based on personal visits over several years it is fair to say that Eravikulam is one of the best-managed parks in all of India (*Photo 7*; see also the Park's website www.eravikulam.org). It has natural borders that prevent encroachment and it is staffed by dedicated forest rangers. The tea estates on its boundaries are sympathetic to its conservation and protection. Its main challenges are dealing with a significant increase in tourists who want to see the famous "wild goats."

The raison d'être for Eravikulam's notification as a national park was to protect the endangered Nilgiri Tahr *(Hemitragus hylocrius, Photo 3)*. Nilgiri Tahrs are mountain goats that are restricted to the rugged highlands of the southern Western Ghats. They are con-

nected to a genus of mountain goats that once stretched from the Arabian Peninsula to the Himalaya and south into the Western Ghats. Changes in climate and physical features have left only three species in the genus, the Arabian *(H. jayakari)*, Himalayan *(H. jemlahicus)* and Nilgiri Tahr. A formidable distance separates Nilgiri Tahr from their nearest neighbors, the Himalayan Tahr. The Nilgiri Tahr are agile ungulates that feed exclusively on the native high altitude grasses of the southern Western Ghats. They use the precipitous granite cliffs that are a feature of the hills as protection against predation from leopards, dhole (Indian wild dog) and tigers.

In the 20th century tahr populations drastically fell as a result of habitat loss and out of control hunting and poaching. The entire population of Nilgiri Tahr is thought to be no more than 2,000 individuals in the wild with approximately 700–800 of these are in Eravikulam (Eravikulam Management).

Ecology of the shola/grasslands

From an ecological point of view Eravikulam is highly significant as it hosts the best-preserved and largest undisturbed shola/grasslands habitat left in the Western Ghats *(Photo 4)*. The shola/grasslands system is found above 1,700 meters in the highest reaches of the Western Ghats (sometimes a figure of 1,800 meters is used and this varies depending on latitude and local topographical and climatic conditions). Significant *shola*/grasslands systems are located in the Nilgiri, Palni, Anaimalai Hills and the High Range. There are noteworthy patches that appear in a similar manner located at slightly lower attitudes. Sri Lanka has near identical habitat in the patanas and cloud forests of Horton Plains in its Central Highlands.

The *shola*/grasslands mosaic is typically found on high plateaus composed of gentle, undulating hills or steep cliffs with shallow soil structure. The grasslands occupy a larger proportion of the area (80 %) of the upper plateaus than sholas. Sholas are tropical montane forests that are found in the valleys and folds of mountains above 1,700 meters in the southern Western Ghats (*Photo 2* and *6*). The word "shola" is taken from the Tamil word "sholai" meaning any evergreen forest or thicket and the word has often been used to name lower forests areas. It is now more correctly associated with the native forests of the lofty plateaus of the southern Western Ghats. Like other montane forests in tropical areas *sholas* usually experience high rainfall during seasonal rains. Cloud forests are able to derive moisture from wet mist when it is not actually raining and this may apply to some of the *sholas* in the Western Ghats. Their location in valleys provides better protection from monsoon winds and offers better soil conditions with higher moisture and nutrient content. Wind is an important factor and the canopy height of *sholas* is rarely above 15 meters (with some notable individual trees growing as high as 40–60 m).

Photo 6: Shola/Grasslands in the Core Zone

Winter view looking west over the weathered undulations of the central "Core Zone" of Eravikulam National Park. The dark clumps in the folds of the grassy hills are shola forests.

Higher altitudes mean colder temperatures and in many of the ranges it is common to have freezing temperatures during the winter months. Frost is a common feature in grasslands from December to February in these areas. The *sholas*, with their canopy of evergreen vegetation, are able to maintain more constant temperatures throughout the year. While grasslands can have severe frost, it is unlikely to find any in a neighboring shola. This is im-

Photo 7: Counting Tahr

A Mudhuvan tribal, working for the Kerala Forest Department, scans a grassy hill for the elusive Nilgiri Tahr (Hemitragus hylocrius). He is participating in an annual wildlife census within Eravikulam National Park. Mudhuvans have traditionally lived on the edge of what is now Eravikulam National Park. They have an unsurpassed knowledge of the hills and have long been employed by the large tea estates that surround the 90 km^2 protected area.

portant for regeneration since shola saplings cannot survive winter frost. Grasses, on the other hand, will die off above the surface level while their root structure is able to survive the frost, not to mention grazing and fire. One of the few tree species to be found in grasslands is the fire tolerant rhododendron *(Rhododendron nilagiricum, Photo 5)*.

Ecological value and threats

Ecologists recognize several important traits in undisturbed *shola*/grassland systems. Firstly they are now recognized as a unique system with fascinating linkages to similar montane systems in Sri Lanka and other tropical mountainous areas. Secondly they have significant biodiversity that is not found elsewhere. Lastly and most importantly to humans who have never seen them, *shola*/grasslands provide water security for millions of people living in the shadow of the hills. The shola/grasslands act much like a giant sponge, absorbing monsoon rains and releasing them slowly through the year.

One of the most significant threats to grasslands has been their widespread conversion into monoculture plantations of non-native timber. Fast growing species such as *Eucalyptus globus*, *Pinus patula* and *Acacia mearnsii* were intensively planted in almost all of the upper areas of the Western Ghats since colonial times. In recent decades, with aforestation gaining popularity in official circles, it was thought that the timber provided by these programs would be worth any ecological costs. Biodiversity at this point was not recognized as a significant value in the un-notified areas of the upper Western Ghats.

The conversions of grassland into plantations started during colonial times after many of the upper ranges were "discovered" and developed into hill-stations and tea estates. Tree plantation expansion continued after independence and several important hill areas were severely damaged by hydroelectric schemes. In the 1960s and 1970s industrial demand on the plains (such as for tannin by the leather industry) helped encourage plantation expansion in many hill ranges. By the 1980s very few of the elevated plateaus of the southern Western Ghats were untouched. A significant issue with several species (wattle and lantana) is that they self-seed and unintentionally spread into undisturbed areas.

Eravikulam remains a relatively secure and well-managed National Park in South India at the onset of the 21st Century. With other similar landscapes having been converted to plantations and settlements it is a critical example of a habitat that was once more widespread. It will remain an important site for its protection of the Nilgiri Tahr and undisturbed *shola*/grasslands systems. ■

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