THE NILGIRI BIOSPHERE RESERVE

A biosphere reserve contains a set of unique ecosystems rich in biodiversity such as medicinal plants, traditional landraces or crops and their wild relatives, ancient races of domestic animals and indigenous people.

The Nilgiri Biosphere Reserve

The Nilgiri Biosphere Reserve was the first biosphere reserve in India established in the year 1986. It is located in the Western Ghats and includes 2 of the 10 biogeographical provinces of India. A wide range of ecosystems and species diversity are found in this region. Thus, it was a natural choice for the premier biosphere reserve of the country.

- The Nilgiri Biosphere Reserve was established mainly to fulfill the following objectives:
- To conserve insitu genetic diversity of species
- To restore degraded ecosystems to their natural conditions
- To provide baseline data for ecological and environmental research and education
- To function as an alternate model for sustainable development

State	Area (sq. km.)
Tamilnadu	2537.6
Kerala	1455.4
Karnataka	1527.4

The Nilgiri Biosphere Reserve falls under the biogeographic region of the Malabar rain forest. The Mudumalai Wildlife Sanctuary, Wynaad Wildlife Sanctuary Bandipur National Park, Nagarhole National Park, Mukurthi National Park and Silent Valley are the protected areas present within this reserve.

Geography

The total area of the Nilgiri Biosphere Reserve is 5,520 sq. km. It is located in the Western Ghats between 76°- 77°15'E and 11°15' - 12°15'N. The Nilgiri Biosphere Reserve encompasses parts of Tamilnadu, Kerala and Karnataka. The annual rainfall of the reserve ranges from 500 mm to 7000 mm with temperature ranging from 0°C during winter to 41°C during summer.

Vegetation

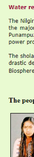
The Nilgiri Biosphere Reserve comprises of substantial unspoilt areas of natural vegetation ranging from dry scrub to evergreen forests and swamps thus contributing to highest biodiversity. The altitude and climatic gradients support and nourish the different vegetational types.

Moist evergreen forests

Sholas and grasslands

VEGETATIONAL TYPES OF THE NILGIRI BIOSPHERE RESERVE

S.No	Forest type	Nature of Vegetation	Area of occurrence
1.	Moist evergreen	Dense, moist and multi storeyed forest with gigantic trees	In the narrow valleys of Silent Valley
2.	Semi evergreen	Moist, deciduous	Nilambur and Palghat division
3.	Thorn	Dense	North east part of the Nilgiri district
4.	Savannah woodland	Trees scattered amid woodland	Mudumalai and Bandipur
5.	Sholas & grasslands	High elevated evergreen with grasslands	South and western catchment area, Mukurthi national park



Flora

The Nilgiri Biosphere Reserve is very rich in plant diversity. About 3,000 species of flowering plants can be seen here. Of the 3,300 species 132 are endemic to the Nilgiri Biosphere Reserve. The genus **Impatiens** is exclusively endemic to the Nilgiris. Some of the plants endemic restricted to the Nilgiri Biosphere Reserve include species of **Adenoon, Calacanthus, Baeolepis, Freree, Jarodina, Wagatea, Poecilloneuron, etc.**

Of the 175 species of orchids found in the Nilgiri Biosphere Reserve, 8 are endemic to the nilgiri Biosphere Reserve. These include endemic and endangered species of **Vanda, Liparis, Bulbophyllum, Spiranthes** and **Thrixspermum.** The sholasof the Nilgiri BiosphereReserve are a treasure house of rare plant species.

Plant type	No. of species
Angiosperms	3238
Gymnosperms	71
Pteridophytes	134

Fauna

The fauna of the Nilgiri Biosphere Reserve isdiscovered over 100 species of mammals, 350 species of birds, 80 species of reptiles and amphibians, 300 species of butterflies and innumerable invertebrates. 39 species of fish, 31 amphibians and 60 species of reptiles endemic to the tiwestern Ghats also occur in the Nilgiri Biosphere Reserve. Fresh water fish such as **Danio neilgherriensis,Hypselobarbusdubius** and **Puntius lovanicus** are restricted to the Nilgiri BiosphereReserve. The Nilgiri tahr, Nilgiri langur, slender loris, blackbuck, tiger, gaur, Indian elephant and marten areasome of the animals found here.

Water resources

The Nilgiri Biosphere Reserve is one of the critical catchment areas of peninsular India. Many of the major tributaries of the river Cauvery like the Bhavani, Moyar, Kabini and other rivers like Chaliyar, Bharatpuzha, etc., have their source and catchment areas within the reserve boundary. Many hydroelectric power projects are present in the Kundah, Bhavani and Hoyar basins .

The sholas and grasslands play a very important role in retaining water and supplying it to these streams. A drastic decline in the sholas and grasslands is one of the reasons for the recent water scarcity in the Nilgiri Biosphere Reserve.

The people

A variety of human cultural diversity can be found in the Nilgiri Biosphere Reserve. The increase in population is attributed to migration from surrounding areas rather than the population growth ofindigenous people. Tribal groups like the Todas, Kotas, Irullas, Kurumbas, Paniyas, Adiyars, Edaradan Chetti, Cholanaikkans, Allar,Malayan, etc., are native to the reserve. Except for Cholanaikkans who live exclusively on food gathering, hunting and fishing, all the other tribalgroups are involved in their traditional occupation of agriculture.

Problems of the Nilgiri Biosphere Reserve

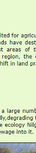
The Nilgiri Biosphere Reserve has been enduring human interference for a very long time through development projects such as hydroelectric power projects, agriculture, horticulture, etc., which have brought about substantial change in the ecology of the area. Many environmental problems are noticed in different parts of the Nilgiri Biosphere Reserve.

Intensive felling

The increase in influx of population from the surrounding areas has led to deforestation and consequent habitat destruction. Between 1990 – 96 there has been a decrease in the dense forest areas. 28.96 sq. km. of dense forests have become open forest and 22.67 sq. km. of dense forests have changed into non-forest areas. Intensive felling has led to multiple problems like destruction, depletion and degradation of the environment and its natural resources.Indiscriminate clearing of forests destroyed the habitats of the several species of animals and birds of the Nilgiris. Some of them like the Nilgiri wood pigeon, Nilgiri pipit and Nilgiri langur that are endemic to this region have hence become highly endangered. Animals like the elephant, tiger and leopard are moving closer to human settlements owing to the shrinking of forest areas.

Plantations (monoculture)

The Nilgiris, which support a variety of tree species, are threatened by monoculture. The sholas are being destroyed for plantations. Monocultures of eucalyptus, wattle, blue gum, cash crops like tea, coffee, cardamom and fruit crops like potato have degraded the soil quality along with excessive use of fertilizers. The tea bushes require frequent appli cation of fertilizer, which has made the soil porous. During heavy rain, these slopes are easily washed away resulting in a landslide



Comparsion of the different types of vegetation in the Nilgiri Biosphere Reserve between 1849 and 1992

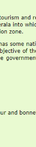
Total Area	Ouchterlony's map (1849)	Current map(1992)
Sholas	8,600 ha	4,225 ha
Grasslands	29,875 ha	4,700 ha
Cultivation	10,875 ha	12,400 ha
Tea	0 ha	11,475 ha
Wattle	0 ha	9,775 ha
Eucalyptus	0 ha	5,150 ha

Grazing

The sholas were used for grazing cattle. The livestock population inside the Nilgiri Biosphere Reserve is very low but the population in the periphery is very high. Destruction of the sholas has led to disappearance of perennial streams, causing soil erosion and hence climate changes. Overgrazing has led to degradation of low and high level grasslands, which harbour a large number of endemic species.

Forest fires

Forest fires are more common in the sholas and dry deciduous forests. They are both accidental as well as deliberate. The annual fire set off during the summer months for a better pasture in the ensuing monsoon is another manmade threat to the biological diversity.



Development and construction activity

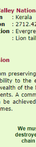
Due to developmental activities large areas of forests have been cleared in and around the Nilgiri Biosphere Reserve. More human habitation has resulted in largescale road laying activity that connects even remote forest areas to the nearest urban centre. Construction activities like road building have unleashed widespread landslides and slope destabilization. Construction of the Kabini reservoir has submerged the valley between Nagarhole and Bandipur.

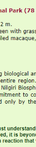
Horticultural and agricultural practices

Extension of agriculture, and use of lands unsuited for agriculture have accelerated soil erosion. Human settlements on the uplands have destroyed the sholas. Soil erosion is severe in the east and southwest areas of the Nilgiris where the monsoons are heavy. In the Hyoore plateau region, the extension of irrigation canals from reservoirs has led to a largescale shift in land practices.

Tourism

The Nilgiris are an important tourist centre in South India, and attract a large number of tourists. A large number of hotels, clubs, resorts, gardens and roads have emerged rapidly, degrading the natural vegetation. Extensive pollution and water scarcity are the result affecting the entire ecology Nilgiri Biosphere Reserve. The Ooty Lake has been ruined accumulating garbage and disposal of sewage into it.





Conservation and management of the Nilgiri Biosphere Reserve

Conservation and management of the Nilgiri Biosphere Reserve depends on the coordination between government agencies and the local people. For effective management, the Nilgiri Biosphere Reserve has been zonalized as

- core zone (1240 sq.km)
- buffer zone (4280 sq.km)

The buffer zone is further divided into manipulation zones like forestry, tourism and recreation zones. These zones are located in all the three states of Tamilnadu, Karnataka and Kerala into which the Nilgiri Biosphere Reserve extends. Most of the plantations are seen only in the manipulation zone.

Being one of the hotspots of biodiversity, the Nilgiri Biosphere Reserve has some national parks and wildlife sanctuaries within its boundaries. Conservation of wildlife is the main objective of these national parks and wildlife sanctuaries. Some of these areas have been designated by the government as Project Tiger and Project Elephant areas.

Mudumalai wildlife sanctuary (321 sq.km)
Location : N.W. corner of Nilgiri plateau, Tamilnadu
Elevation : 900 to 1000 m.
Vegetation : dry deciduous scrub
Fauna : elephant, sambar, gaur, Indian giant squirrel, Nilgiri langur and bonnet macaque

Mukurthi National Park (80 sq.km)
Location : S.E. corner of the Nilgiri plateau, Tamilnadu
Elevation : 2400 m.
Vegetation : Sholas and grasslands
Fauna : Nilgiri tahr (state animal of Tamilnadu)

Bandipur National Park (800 sq.km)
Location : Convergence of the Eastern and Western Ghats, Karnataka
Elevation : 900 m.
Vegetation : Ranges from moist deciduous to scrub
Fauna : Elephant, gaur, sambar, barking deer, sloth bear, jackal, wildboar, Malabar squirrel, chowsingha, etc.

Nagarhole National Park (Rajiv Gandhi National Park) (572 sq.km)
Location : S.E. part of Kodagu district, Karnataka
Vegetation : Deciduous forest interspersed with swamps
Fauna : Elephant, chital, sambar, muntjac, tiger, leopard and wild dog

Wynaad Wildlife Sanctuary (344 sq.km)
Location : Kerala
Elevation : 650 to 1100 m
Vegetation : Moist dry deciduous
Fauna : Elephant, sambar, chital, tiger, wild dog and leopard, freshwater fish like Travancoria, Bhavania and Bargus

Silent Valley National Park (78 sq.km)
Location : Kerala
Elevation : 2712.42 m.
Vegetation : Evergreen with grasslands
Fauna : Lion tailed macaque, Nilgiri marten and Nilgiri tahr

Conclusion

Apart from preserving biological and cultural diversity, the Nilgiri Biosphere Reserve also provides ecological sustainability to the entire region. Research and monitoring of the management and conservation of the natural wealth of the Nilgiri Biosphere Reserve are being carried out by various government institutions and departments. A commitment to conserve this natural treasure house of resources is the need of the hour. This can be achieved only by the participation and co-operation of the local people in the conservation programmes.

We must understand and remember that once the balance of nature is disturbed or destroyed, it is beyond man's capability or capacity to stop or prevent the disastrous chain reaction that will be triggered off destroying the entire human community.