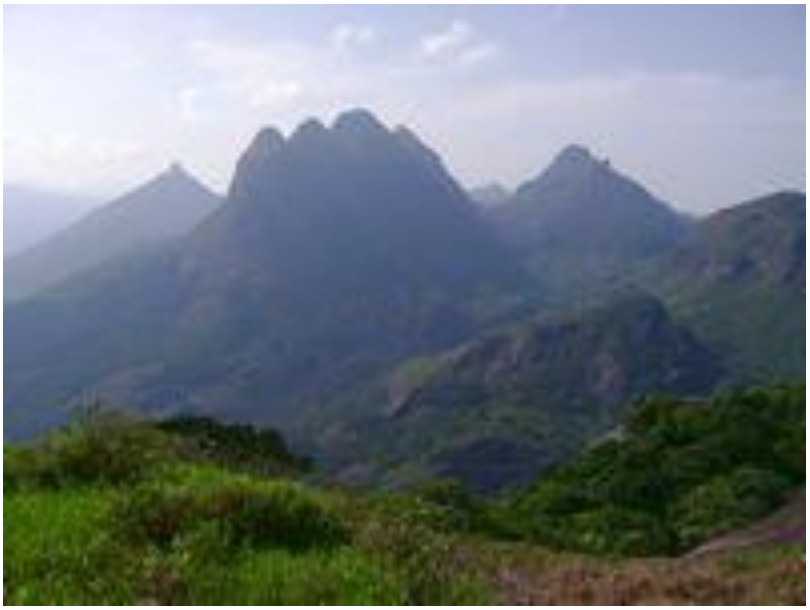
Agasthyamalai Biosphere Reserve



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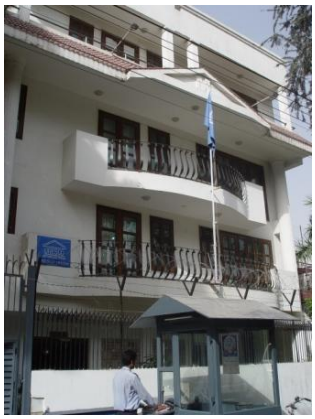
There are 393 biosphere reserves that exist within 94 countries in the world. (International Biosphere Reserve) Biosphere Reserves are secured areas in which are used to preserve the resources within that area. It originated from the UNESCO's Man and Biosphere program which was created in 1971 that wanted to conserve resources like flora and fauna within countries. With these areas, our future ancestors may research and possibly use some of the things from these areas for the better good of mankind. Before an area can be considered a biosphere reserve, it must go through a detailed survey. If an area has or is beginning to lose a species of organisms, it will be sent to the top priority of the proposal. Biospheres in India tend to be a mixture of existing national parks and animal sanctuaries. Much of these areas are still ran by the community with only assistance with 5,520 sq. ft. of land by UNESCO. The land that is not protected by UNESCO is managed by committees with no legal protection.



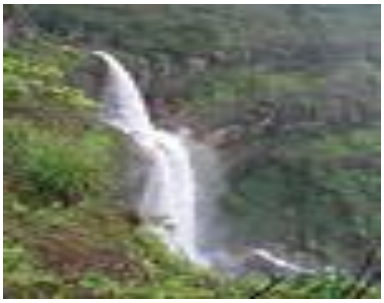
This is the UNESCO office located in New Delhi.

The Agasthymailai Biosphere Reserve central location is 8 degrees 39' north and 77 degrees 13' east. The Agasthymalai Biosphere Reserve is located in two states; Tamil Nadu and Kerala. This reserve has a total area of 3500 square km; 1828 square km is in kerala and 1672 square km is in Tamil Nadu (WorldLingo Translations LLC).

The Agasthyamalai region is partly located on the southern part of the Western Ghats. It contains moist forests and tropical forests. Parts of Agasthyamalai are classified as a mid-elevation tropical wet evergreen rainforest and other areas are subtropical climatic regimes. One of the regions in Agasthyamalai is the Kalakad-Mudanthurai Tiger Reserve. In the rainforest there are three different seasons throughout the year. (Niranjan, 2005) The seasons in part of Agasthyamalai are much different than the seasons in America. During these seasons the area experiences different weather patterns. One season, is February through May, and this is when Agasthyamalai is experiencing a dry season.

Another season is June through September; during this season the climate occurring is the southwest or summer monsoons. The last season is October through January; this is when the northeast or winter monsoons are taking place. Over half of its annual perception is received during the northeast monsoons in this area. (McGinley, 2008) The rainfall decreases from south to north. These climates vary throughout the seasons.

The Malabar Plains and the chains of mountains running parallel to India's western coast form the Western Ghats. These feathers cover approximately 160,000 square kilometers of area. (McGinley, 2008) The mountains in the western area experience heavy rainfall during the southwest monsoons; however, the eastern mountains do not experience nearly as much rainfall throughout the year. (McGinley, 2008) These mountains contain several rivers, which are extremely important to the people who live in the area. The rivers provide drinking water, irrigation, and other numerous useful purposes. The regions complex geography also includes; plains, tropical and deciduous rainforest, grasslands, and forests. These geographical locations house an outstanding number of plants and animals. This area has an incredibly diverse plant population. There are nearly five thousand species of vascular plants in the Western Ghats. (McGinley, 2008) India also, has a high population rate. Due to extreme population, a number of forests in the Western Ghats are protected by the Forest Conservation Act.



This is one of the waterfalls that run through the biosphere.

The Western Ghats includes all of the Agasthymalai Biosphere Reserve. The Western Ghats is a mountain chain along the coast of India beginning south of the Tapti River extending to Kanyakumari. The Western Ghats is thought to actually be a raised plateau and not a mountain range. In any case the Western Ghats exceeds the Agasthymalai Biosphere Reserve

This is a picture of the moist deciduous forest of the Western Ghats.

into another reserve called the Niligir Biosphere Reserve. The Western Ghats passes through several states, Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. The Agasthylmalai Biosphere Reserve only includes Tamil Nadu and Kerala.

In February of 1999, the idea of making the southernmost part of the Western Ghats a biosphere had began to arise. This area of 3,500 sq feet region was going to be put to the tests of the UNESCO to see if they would fund this proposal. One of the strong features to getting this pasted is that Agasthyamalai is considered as the richest biographical province in India. (Chennai, 2001) Because of this, many believe that they should make Agasthyamalai a biosphere reserve so that they may preserve the resources. The emphasis of this movement was to sustain, research, and educate others on the numerous resources found in this region. When the UNESCO began its investigation on whether or not their organization should fund such a thing, they look at whether or not the area was at a sustainable level. From there, they have to stress that people research and monitor activities, document changes within the resources, and education within the community and international.

If you would take a safari ride through the Agasthymalai Biosphere Reserve it would be the ride of a lifetime because you would be riding through an area known to the world as the Western Ghats. You would see an array of mountain ranges, plants and animals you could not find in any other part of the world, and many different types of forests and vegetation. The Western Ghats is extremely diverse in animals, plants, and physical environments.

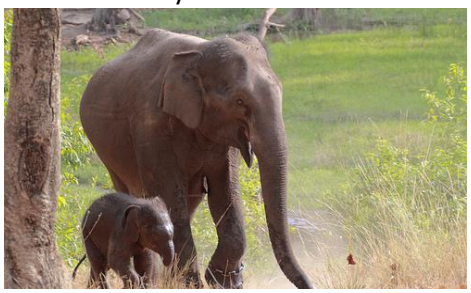
Here you can see the luscious green color of the wet portion of the Western Ghats

The Western Ghats includes all of the Agasthymalai Biosphere Reserve. The Western Ghats is qualified as a "Biological Hotspot" because unfortunately it has lost more than 70% of its original habitat but contains over 1500 species of vascular plants as endemics. An organism is said to exhibit endemism when it is exclusively native to a place (defined by K. Rajmohana and C. Radhakrishnan). The Western Ghats includes 5 separate large units of land or water containing geographically distinct assemblages of species, natural communities, and environmental conditions which are known as ecoregions. These ecoregions include 4 different forest types, evergreen, semi evergreen, moist deciduous, and dry deciduous. The largest of the forests is the moist deciduous then the semi evergreen, then dry evergreen, then the smallest, the evergreen forest.

Here you can see how dry the dry portion of the Western Ghats is.

Size doesn't matter to the evergreen forest because although being the smallest of the 4 forest types it has the highest level of endemic species primarily being trees. This forest can be found on the steep windy sides of the mountain range with an average rainfall of 2500-5000mm a year. More than half the trees in this area are endemic. Due to the high, medium and low elevations in the Western Ghats house a number of species, many of which are localized endemics (Rani M. Krishnan and B.R. Ramesh). A family which endemism occurs most is Dipterocarpaceae which are tropical lowland rainforest trees and Ebenaceae which are flowering plants.

The dry deciduous forests run closely together with the largest forest; the moist deciduous forests. Maximum levels of endemic species are found at the transition zones (between dry and wet forest types) (Rani M. Krishnan and B.R. Ramesh). The dry deciduous forests are the

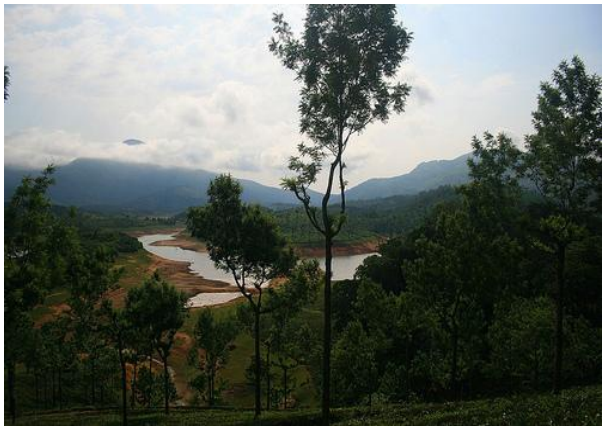


The Asian Elephant seen here has both man made and natural habitats in India and many other parts of the world.

least biologically rich but are very important for conservation of elephants and tigers which are two of the largest and most studied mammals of the Western Ghats. The Moist deciduous average rainfall is 2500-3500mm a year compared to the dry deciduous forest 900-2500mm it is almost double.

The semi-evergreen forests only run through the states of Maharashtra, Goa, and Karnataka. These forests are classified as semi-evergreen because they include secondary evergreen dipterocarp forests, lateritic semi-evergreen forests, bamboo brakes, and riparian forests. These forests have the second highest level of tree diversity and endemism. Other vegetation types in the Western Ghats are scrub jungles, savannas, high rainfall savannas, peat bogs, and myristica swamps.

The complex topography of the Ghats with a wide range of microclimatic and soil conditions have resulted in a mosaic of plant communities and animals associations unique to itself (K. Rajmohana and C. Radhakrishnan). The Western Ghats contains 27% of all plant, fish, amphibian, reptile, bird and mammals found in India. The Western Ghats has over 7000 species of flowering plants the largest among them endemic to the area are Dipterocapaceae (tropical lowland rainforest trees), Anacardiaceae(flowering plants bearing fruit), Lanraceae (flowering plants), Fabaceae(flowering plants known as legume family), and Rabiaceae(called madder family, bedstraw or coffee family) and Myrtacea(family of dicotyledon which have two embryonic leaves).



In this photo of the Western Ghats you can see one of the major rivers caused fueled by the monsoon. The Western Ghats has 3 large rivers, 13 medium sized rivers, and hundreds of streams and smaller rivers.

Among the vertebrates with a much smaller ranger are 137 mammal species, 508 bird species(largest number of identified vertebrates), 225 reptiles, and 156 amphibians. Research on invertebrates has been primarily focused on butterflies and ants, not much is known about other insects. Recent studies have identified 200

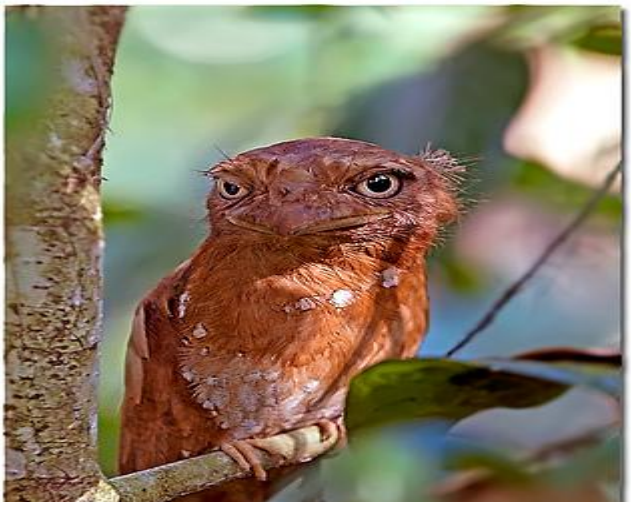
species of spiders in the Western Ghats. There are 36 exclusively native butterflies but among the invertebrates land snails have the highest level of endemism.

The monsoon that the Western Ghats experiences each year contributes greatly to its biological richness. The western side of the Western Ghats experiences receives very high rainfall, while the eastern side does not. This monsoon feeds the rivers of the Western Ghats which are home to many freshwater fish and amphibians. Without the monsoon there could not exist the most significant amphibians of the Western Ghats which is the Purple Frog, *Nasikabatrachus sahyadrensis* is a living fossil because it belongs to the ancient family Sooglossidae. 78% of amphibians in the Western Ghats are endemic. The Monsoon which is a seasonal reversing wind accompanied by season changes in precipitation last 3-4 months each year. Roughly 140 species of reptiles are endemic to this region; endemism is high among the lizards of the Western Ghats.

In this photo you see the Western Ghats during the Monsoon which causes a constant drizzle throughout the rainy season.

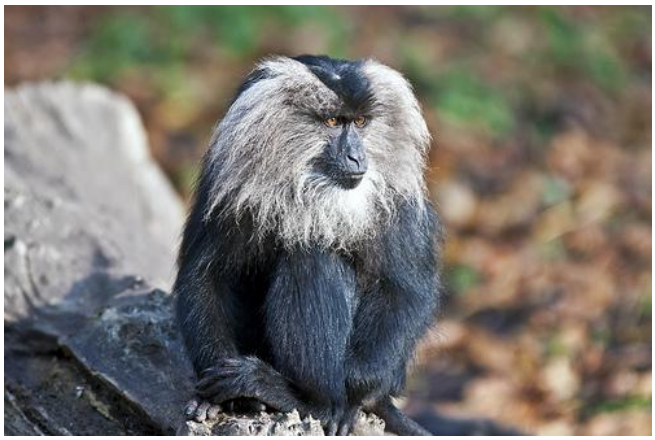
508 total recorded and growing species of birds live in the Western Ghats in all areas; the Niligiri pipit is a high-elevation grassland species is exclusively native to Western Ghats. So far there are 16 endemic species of birds located in the Western Ghats. 7 of the endemic species of birds located in the Western Ghats are on the globally threatened list.

The mammals cause most of the attraction for conservation efforts. Animals we are more familiar with like the Asian Elephant and the Tiger are the most studied animals of the Western Ghats. Among the 137 mammals 16 are endemic to the region and tragically 30 of them are listed as



One of the most interesting looking birds living in the Western Ghats is the Srilankan Frogmouth (left) which is endemic to the Western Ghats.

globally threatened. One endemic primate, Lion-tailed Macaque of the evergreen patches is also one of the most studied mammals; the Western Ghats is home to the largest population of the globally threatened Lion-tailed Macaque.



Above is the Lion-tailed Macaque which primary home is in the Agasthymailai Biosphere Reserve.

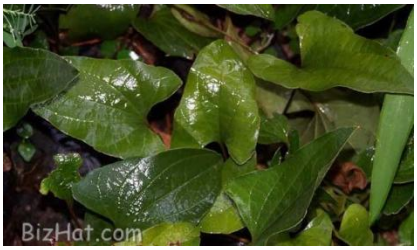
Conservation of the Western Ghats is challenging because we do not fully understand the complex ecosystem. Due to the high extent and pace of environmental degradation as per a recent estimate only 6.8% of the original forest cover now exists in the Western Ghats (K. Rajmohana and C. Radhakrishnan). Some factors contributing to this degradation are illegal local hunting, large scale fuel wood and fodder extraction, forest fires, poaching, commercial wildlife trade, unrestricted use of pesticides, etc. The list is endless and the loss of this unique and fragile ecosystem is mainly due to us and we literally will not know what we have lost once it is gone.

Agasthyamalai is home to ¼ of India's 10,000 plant species. With the wide span of topography, it offers protection and home to large varieties of shrubs, lianas, cycads, ferns, fungi moss and bryophytes. There is also a large variety of herbs and medical plants that are home to this area. For some of the locals, this is their only form of medication. Under the mantle of evergreens, very few plants grow. It is also home to large numbers of wildlife, such as the rare nilgiri tahr. There are also large number of ecosystems within this area consisting of rich amounts of birds, insects, and birdlife. You can also find numerous types of flowers that consist of bright colors such as blues and

This is one of the cycads found amongst the many plants on the reserve.

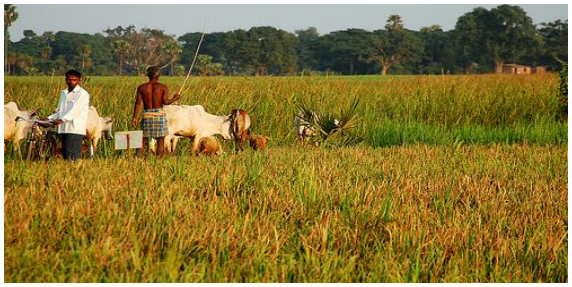
The Rare Nilgiri Tahr is one of the many animals the reserve protects.

yellows which are attractive to the pollinating insects. The entire life structure within this reserve has never been fully explored so we still have many things to learn from areas such as these. They have done some recent studies that showed there were 90 taxas around the reserve. Within the 90 they found, 58 were mosses and 32 we liverworts. (Manju, 2009) There is a possibility that angiosperms' may exist in this area. With new forms of angiosperms we can find new forms of medication that may one day result in the cure of a disease. The Tropical Botanical Gardens and Research Institute and the local Kani tribe found a plant that the locals call Arogyapachha (trichopus zeylanics) (Hempstead, 2003). This plant gave a strong source of energy to the researchers. The issue with researching these areas is that researchers cannot link some of the great number of species. There are also many changes that occur within these areas that can cause new forms of organisms to form, such as a tree fall opening sunlight cause new plants to grow within decades.



Arogyapachha is used by the locals as a energy supplement.

The Ministry of Environment and Forests is doing research in the Western Ghats. They fund money to do research on the inter relation between flora and fauna in the Agasthyamalai Biosphere Reserve. (Development, 2008) There are several other organizations that fund money for research in Agasthyamalai, such as; Trivandrum for Nilgiri and Gulf of Mannar Brs; Regional Plant Resource Centre and Zoological Survey of India.


Here you can see researchers collecting their findings.

Agasthyamalai would be a beautiful place for people all over the world to go visit. From the stunning mountains ranges to the unique forests, all have astonishing qualities to tour. In 2007, there was an estimated five million foreign tourist in India alone. (IANS, 2008) While in Agasthyamalai, there

are numerous National Parks for people to tour. Kalakad-Mundathurai is located right in the Agasthyamalai Hills. (Niranjan, 2005) The Kalakad-Mundathurai Tiger Reserve is known for its diversity in plants and animals. This park helps protect endangered wildlife, including; Tigers, Sloth Bears, and Indian pangolin. In India, there are also other places where people can go bird watching or they can even go mountain biking.

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   My first source is a web site source. World Lingo provides all details about the location of my biosphere: Agasthyamalai. I feel this single source will provide me with all information necessary for location. This source includes global coordinates, all districts in India Agasthyamalai is located in and other miscellaneous information dealing with location

2. WorldLingo Translations LLC. (2009). *Agasthyamalai Biosphere Reserve*. Retrieved September 29, 2009, from http://translate.roseville.ca.us/ma/enwiki/en/Agasthyamala_Biosphere_Reserve

   This same website provides an abundance of information about the ecology of Agasthyamalai, knowing very little about this region or its inhabitants a lot of valuable topics stem from here. This website is semi descriptive I gain a great deal of information about Agasthyamalai while being able to point out the major, broader points of Agasthyamalai in relation to its ecosystem.

3. K. Rajmohana and C. Radhakrishnan. *Western Ghats A hotspot of biological wealth*. Retrieved September 29,2009, from http://zsienvis.nic.in/NB_item/western%20ghats.pdf

   Agasthyamalai is made up of three major regions the Western Ghats is its major region. Western Ghats consists of mountains, rivers, several different types of forest with many medicinal plants, and many different animal species. This article titled Western Ghats A Hotspot of Biological Wealth includes all of the thriving ecological aspects of the Western Ghats region and ultimately Agasthyamalai itself. In these 30 pages includes statistics, pictures and information on endangered wildlife and generally an overview of the Western Ghats ecosystem.

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This article is a study based around a central question; “how endemism is distributed with respect to the secual systems of the entire tree flora of the wet evergreen forests of Western Ghats.” This source had valuable information about endemism. Also this article provided valuable statistics about the endemic species of the Western Ghats and what we can do to improve our knowledge of them in the Western Ghats.

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