



# Exploring the Ecological Significance of the Western Ghats: A Geographical Study

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## Abstract

This paper attempts to study importance of the western Ghats ; have a major influence on the ecological and biophysical processes on the entire peninsula of India. Older than the Himalaya mountains, the mountain chain of the Western Ghats represents geomorphic features of immense importance with unique biophysical and ecological processes. The site's high montane forest ecosystems influence the Indian monsoon weather pattern. Moderating the tropical climate of the region, the site presents one of the best examples of the monsoon system on the planet. It also has an exceptionally high level of biological diversity and endemism and is recognized as one of the world's eight 'hottest hotspots' of biological diversity. The forests of the site include some of the best representatives of non-equatorial tropical evergreen forests anywhere and are home to at least 325 globally threatened flora, fauna, bird, amphibian, reptile and fish species. The hill ranges of the Western Ghats, a global biodiversity hotspot, extend along the west coast of India from the river Tapti in the north to the southern tip of India.

Their positioning makes the Western Ghats biologically rich and biogeographically unique - a veritable treasure house of biodiversity. Though covering an area of 180,000km<sup>2</sup>, or just under 6 per cent of the land area of India, the Western Ghats contain more than 30 per cent of all plant, fish, herpeto-fauna, bird, and mammal species found in India. Many species are endemic, such as the Nilgiri tahr (*Hemitragus hylocrius*) and the lion-tailed macaque (*Macaca silenus*). In fact, 50 per cent of India's amphibians and 67 per cent of fish species are endemic to this region. The region has a spectacular assemblage of large mammals - around 30 per cent of the world's Asian elephant (*Elephas maximus*) population and 17 per cent of the world's existing tigers (*Panthera tigris*) call this area their home. Protection for these is extended through several nationally significant wildlife sanctuaries, tiger reserves, and national parks.

The Western Ghats include a diversity of ecosystems ranging from tropical wet evergreen forests to montane grasslands containing numerous medicinal plants and important genetic resources such as the wild relatives of grains, fruit and spices. They also include the unique shola ecosystem which consists of montane grasslands interspersed with evergreen forest patches.

Keywords: Endemic Species; Evergreen Forest; Tropical Rain Forest; Black Soil; **Western Ghat.**

## Introduction

The Western Ghats perform important hydrological and watershed functions. Approximately 245 million people live in the peninsular Indian states that receive most of their water supply from rivers originating in the Western Ghats. Thus, the soil and water of this region sustain the livelihoods of millions of people. With the possible exception of the Indo-Malayan region, no other biodiversity hotspot impacts the lives of such a large population.

Historically, WWF-India has had a reasonably strong presence in the region. The organization has been actively involved in the Western Ghats region since the early nineties through the Biodiversity 'Hotspots' Conservation Programme (1993-2005) with support from the MacArthur Foundation and the Ford Foundation. The main focus of work at present has been to identify and map critical wildlife corridors, mitigate human-elephant conflict, strengthen protected area management, promote sustainable livelihoods and assess the status of key species like the tiger and Nilgiri tahr outside protected areas to develop conservation strategies. A strong set of relationships and partnerships has been developed with state and local government authorities, civil society organizations and community groups in the region. The Nilgiris Eastern Ghats Landscape (NEG) is the foremost elephant country of the subcontinent. It has the single largest contiguous population of Asiatic elephants in its range and holds the key to the long term survival of the species. Over 6,000 elephants live in the Nilgiri and Eastern Ghats Landscape which spreads over an area of about 12,000km<sup>2</sup>. Other large mammals found in the area are the gaur, sambar and tiger. The terrain of the landscape is mostly undulating with low hills. The area extends from the south of the Brahmagiri hills in Karnataka through the Wayanad plateau into the northern Nilgiri hill slopes and the Mysore plateau which links up to the Sigur plateau and the Moyar river valley. The Moyar valley rises up the slopes of the Eastern Ghats leading into the Thalimalai plateau going up to the east of the Biligirirangan range into Bargur, Sathyamangalam and Madeshwaramalai up to the Cauvery River. The Southern Western Ghats (SWG) cover an area of 7000km<sup>2</sup> through the states of Kerala and Tamil Nadu and harbour a very rich floral and faunal biodiversity. It forms one of the largest contiguous blocks of 'good' forest cover in the Southern Western Ghats. This region harbours high levels of endemism and over 15 per cent is under the Protected Area network. Some of the important and unique habitat types found here include wet evergreen forests and sholas in the higher elevations. The Southern Western Ghats is also a priority terrestrial and freshwater ecoregion of the WWF global programme with the entire Western Ghats complex identified as a Global Ecoregion 200.

## Objective:

This paper intends to explore and analyze **ecological significance of Western Ghats**; contain 39 properties that include national parks, reserve forests and wildlife sanctuaries. The mountain range is also a "Hottest Hotspot" of biodiversity, being one of eight in the world.

## Outstanding Universal Value: Brief synthesis

The Western Ghats are internationally recognized as a region of immense global importance for the conservation of biological diversity, besides containing areas of high geological, cultural and aesthetic values. A chain of mountains running parallel to India's western coast, approximately 30-50 km inland, the Ghats traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat. These mountains cover an area of around 140,000 km<sup>2</sup> in a 1,600 km long stretch that is interrupted only by the 30 km Palghat Gap at around 11°N.

Older than the great Himalayan mountain chain, the Western Ghats of India are a geomorphic feature of immense global importance. The Outstanding Universal Value of the Western Ghats is manifested in the region's unique and fascinating influence on large-scale biophysical and ecological processes over the entire Indian peninsula. The mountains of the Western Ghats and their characteristic montane forest ecosystems influence the Indian monsoon weather patterns that mediate the warm tropical climate of the region, presenting one of the best examples of the tropical monsoon system on the planet. The Ghats act as a key barrier, intercepting the rain-laden monsoon winds that sweep in from the south-west during late summer.

A significant characteristic of the Western Ghats is the exceptionally high level of biological diversity and endemism. This mountain chain is recognized as one of the world's eight 'hottest hotspots' of biological diversity along with Sri Lanka. The forests of the Western Ghats include some of the best representatives of non equatorial tropical evergreen forests in the world. At least 325 globally threatened (IUCN Red Data List) species occur in the Western Ghats. The globally threatened flora and fauna in the Western Ghats are represented by 229 plant species, 31 mammal species, 15 bird species, 43 amphibian species, 5 reptile species and 1 fish species. Of the total 325 globally threatened species in the Western Ghats, 129 are classified as Vulnerable, 145 as Endangered and 51 as Critically Endangered.

**Criterion (ix):** The Western Ghats region demonstrates speciation related to the breakup of the ancient landmass of Gondwanaland in the early Jurassic period; secondly to the formation of India into an isolated landmass and the thirdly to the Indian landmass being pushed together with Eurasia. Together with favourable weather patterns and a high gradient being present in the Ghats, high speciation has resulted. The Western Ghats is an "Evolutionary Ecotone" illustrating "Out of Africa" and "Out of Asia" hypotheses on species dispersal and vicariance.[\[tb1\]](#)

**Criterion (x):** The Western Ghats contain exceptional levels of plant and animal diversity and endemism for a continental area. In particular, the level of endemism for some of the 4-5,000 plant species recorded in the Ghats is very high: of the nearly 650 tree species found in the Western Ghats, 352 (54%) are endemic. Animal diversity is also exceptional, with amphibians (up to 179 species, 65% endemic), reptiles (157 species, 62% endemic), and fishes (219 species, 53% endemic). Invertebrate biodiversity, once better known, is likely also to be very high (with some 80% of tiger beetles endemic). A number of flagship mammals occur in the property, including parts of the single largest population of globally threatened 'landscape' species such as the Asian Elephant, Gaur and Tiger. Endangered species such as the lion-tailed Macaque, Nilgiri Tahr and Nilgiri Langur are unique to the area. The property is also key to the conservation of a number of threatened habitats, such as unique seasonally mass-flowering wildflower meadows, Shola forests and Myristica swamps.

### Integrity

The property is made up of 39 component parts grouped into 7 sub-clusters. The serial approach is justified in principle from a biodiversity perspective because all 39 components belong to the same biogeographic province, and remain as isolated remnants of previous contiguous forest. The justification for developing a serial approach rather than just identifying one large protected area to represent the biodiversity of the Western Ghats is due to the high degree of endemism, meaning that species composition from the very north of the mountains to 1,600km south varies greatly, and no one site could tell the story of the richness of these mountains. The formulation of this complex serial nomination has evolved through a consultative process drawing on scientific analysis from various sources. [\[tb5\]](#) The 39 component parts grouped into 7 sub-clusters together reflect the Outstanding Universal Value of the property and capture the range of biological diversity and species endemism in this vast landscape.

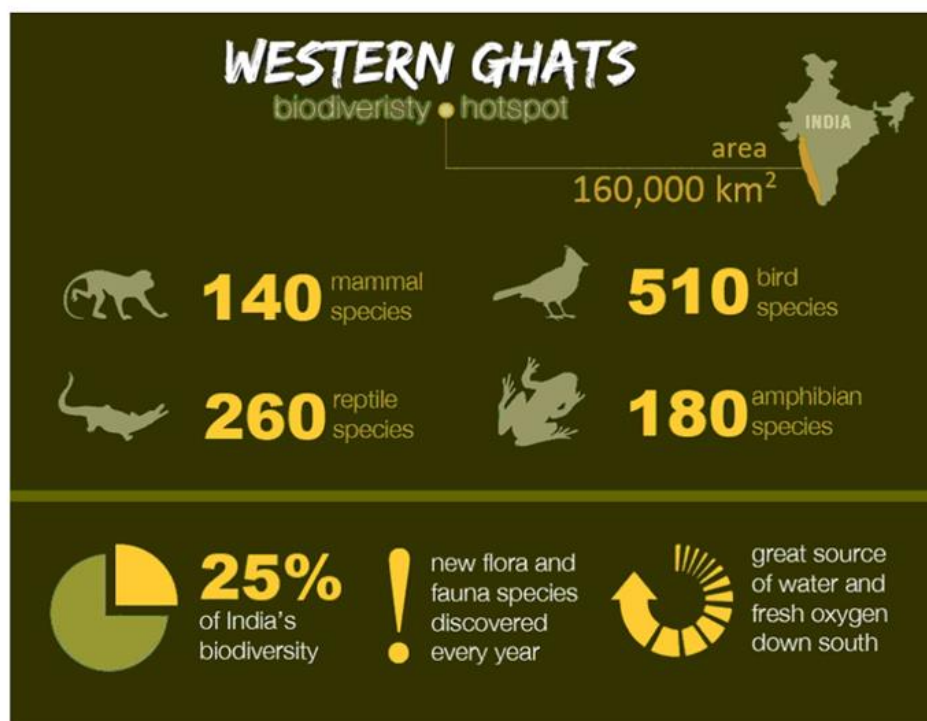
## Protection and management requirements

The 39 component parts of this serial property fall under a number of protection regimes, ranging from Tiger Reserves, National Parks, Wildlife Sanctuaries, and Reserved Forests. All components are owned by the State and are subject to stringent protection under laws including the Wildlife (Protection) Act of 1972, the Indian Forest Act of 1927, and the Forest Conservation Act (1980). Through these laws the components are under the control of the Forestry Department and the Chief Wildlife Warden, providing legal protection. 40% of the property lies outside of the formal protected area system, mostly in Reserved Forests, which are legally protected and effectively managed. The Forest Conservation Act (1980) provides the regulatory framework to protect them from infrastructure development.

Integrating the management of 39 components across 4 States is a challenge, for which a 3-tier governance mechanism is required that will operate at the Central, State and Site levels to provide effective coordination and oversight to the 39 components. A Western Ghats Natural Heritage Management Committee (WGNHMC) under the auspices of the Ministry of Environment of Forests (MoEF), Government of India to deal with coordination and integration issues is already functional. All 39 components in the 7 sub-clusters are managed under specific management / working plans duly approved by the State/Central governments. The livelihood concerns of the local communities are regulated by the Forest Rights Acts, 2006 and their participation in governance is ensured through Village Ecodevelopment Committees (VECs).

## Biodiversity in the Western Ghats

Due to its remarkable length and span, the biodiversity of Western Ghats is diversified and fascinating. According to the **Western Ghats map**, it contains one of the highest levels of endemism on earth. Here, 53% of the fish species, 54% of the 650 plant species, 62% of reptile species, and 65% of amphibian species are endemic in nature. It is also home to 325 threatened species across the globe.



Graphic courtesy: [Amoghavarsha](#)

Among them, 229 are trees, 32 are mammals, 15 are birds, 43 are amphibians, 5 are reptilians, and 1 is fish species. Let us find the biodiversity of animals of Western Ghats.

### 1. Mammals

It has 139 mammals and 16 of them are endemic in nature. Among them, the most threatened are the Nilgiri Tahr (*Nilgiritragus hylocrius*), Lion-tailed macaque (*Macaca silenus*), gaur (*Bos gaurus*), Tiger (*Panthera tigris*), Asian Elephant (*Elephas maximus*), sloth bears (*Melursus ursinus*), Nilgiri langur (*Semnopithecus johnii*), Indian leopard (*Panthera pardus*) and Nilgiri Marten (*Martes gwatkinsii*). Malabar large-spotted civet (*Viverra civettina*) is critically endangered.

### 2. Birds

It has 508 bird species. 16 of them are endemic in nature. The most notable ones that draw the attention of ornithologists across the world are the broad-tailed grassbird, Nilgiri wood pigeon, the Nilgiri pipit, Nilgiri black, rufous-breasted laughing thrush, rufous flycatcher, crimson-backed sunbird, Malabar Grey Hornbill and grey-headed bulbul.

### 3. Reptiles

Nearly 124 reptilian species live in these bio-diverse jungles of Western Ghats. *Melanophidium*, *Teretrurus*, *Plecturus*, and *Rhabdops* are the common endemic shield-tailed snakes here. The other endemic venomous snakes here are the Malabar pit viper, striped coral snakes and the horseshoe pit viper.

### 4. Amphibians

Nearly 80% of the amphibian species are endemic here. Malabar frog, *Micrixalus*, and *Indirana* are the endemic frogs. Among the tree frogs, *Mercurana*, *Ghatixalus* and *Beddomixalus* are endemic too. *Ghato Phryne* and *Pedostibes* are endemic toads.

### 5. Fish

More than 288 freshwater and 35 marine fish species live here. 118 of them are endemic in nature. 97 of the freshwater ones are threatened. 12 are critically endangered, 31 are vulnerable and 54 species are endangered.

### 6. Invertebrates

More than 331 butterfly species can be found in the Western Ghats hotspot. There are 174 dragonfly species and 69 of them are endemic.

### Difference Between the Eastern Ghats and the Western Ghats

Both Western Ghats and Eastern Ghats are mountain ranges located in the western coastal and eastern coastal regions of the Indian subcontinent. Apart from the geographical difference between Eastern Ghats and Western Ghats, the former is cut by rivers but the former can be crossed using passes. The Western Ghats are taller than the Eastern Ghats. The major peninsular rivers originate from the Western Ghats resulting in biodiversity too.

### Environmental Threats to the Western Ghats

The cultivation of coffee, tea, palm, rubber, etc resulted in the deforestation of Western Ghats. The forests are getting depleted day by day making their biodiversity highly vulnerable. The flora and fauna are losing their home to the modern development of civilization.

Wildlife poaching, deforestation, overfishing, and livestock grazing impart serious destruction to nature. The forest and aquatic ecosystems are ruined by the overuse of agrochemicals used in different plantations. The development of train lines, mining areas, and tourist spots in the mountain ranges cause a lot of damage to natural harmony. 13 national parks and 2 biosphere reserves are developed and protected by the government to do so.

### **The Western Ghats and India's Biodiversity**

Being a UNESCO World Heritage Site, Western Ghats is very important in terms of the natural resources and reserves of India. Its perennial river network is of utmost importance to provide water to many states in the Indian Subcontinent. Now that we have discussed what is Western Ghat, we can clearly understand its importance. We have to be very much responsible for our actions and make the best efforts to preserve the natural wealth we have in this region.

The World Heritage status could have implications on development in and around these sites as UNESCO prescribes creation of additional buffer zones around the natural world heritage sites and putting in place an overarching management authority for conservation of the selected 39 serial sites. Conservationists also fear a mad-rush to these sensitive areas in the guise of eco-tourism. "This might trigger commercial activities in the Western Ghats, followed by construction activities like building roads, structures, power lines and other infrastructure, which will defeat the purpose of protecting the green cover and habitat protection," says an activist associated with the Kudremukh Wildlife Foundation in Karnataka.

The Western Ghats expert Prof Madhav Gadgil has welcomed the UNESCO gesture saying, "It will hopefully strengthen the Acts like Biological Diversity Act of 2002, which empowers the local bodies like panchayats to take appropriate steps for conservation." The participation of locals is going to be crucial in determining the success of conservation efforts and promising sustainable development.

All along the Western Ghats in five states, there are lakhs of tribal people who have made their homes in the Ghats. The Thodas of Nilgiris, Soligas of BR Hills, Malekudiyas of Belthangady, Halakki Vokkals of Uttara Kannada, the Sidhis of Kumta, Paniyas of Waynad, Kattunayakans of Malabar and many others in Goa and Maharashtra are some of them. The Perspective Plan for Protection of Biodiversity 2001-16 states that "tribal communities are part of the biodiversity and the state governments should not take them out of their natural surroundings, but empower them democratically and let the government facilities go to them."

The ground situation for people's participation in development is conducive in most parts of the Western Ghats. The region has some of the highest levels of literacy in the country, and a high level of environmental awareness. The democratic institutions are well entrenched, and Kerala leads the country in capacity building and empowering of Panchayat Raj institutions. Goa has recently concluded a very interesting exercise, Regional Plan 2019, of taking inputs from Gram Sabhas in deciding on the land use policies. Evidently, Western Ghats are an appropriate region of the country to attempt to make the transition towards an inclusive, caring and environment friendly mode of development.

## Conclusion

Western Ghats, the mountainous barrier located in the western coastal region of the Indian subcontinent is considered to be one of the **UNESCO World Heritage (2012)** sites in India due to its remarkable biodiversity. It has endemic flora and fauna that spread across 6 western states of India.

The **Western Ghats biodiversity hotspot** is considered to be a cauldron of nature where plants and animals exist in harmony. The endemic species need conservative protection from poaching and deforestation. Let us discuss how important this diverse landform in India is. The Western Ghats is located closer to the western coastal region of the Indian subcontinent. It stretches across 1600 km covering 6 states Gujarat, Goa, Maharashtra, Tamil Nadu, Karnataka, and Kerala. It is 45-60 million years old. Geographically, it starts from Songadh on the Maharashtra-Gujarat border, right at the southern part of the Tapti River and extends to the Marunthuvazh Malai in a village named Swamithope in Tamil Nadu. The total area of these beautiful highlands is 160,000 sq km. The northern highlands or hills are gentler and lower than the southern ones. The average height of these mountains is 1220 m. The extensive ranges are interrupted by Palghat Gaps and Goa Gaps. The highest point in these mountain ranges is Anamudi Mountain. It is 2695 m in height and is situated in Kerala.

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