

Ecoregion

Malabar Coast Moist Forests



Area of the ecoregion
6020 km²



Altitude
0 – 4 m



Annual rainfall
24 – 800 mm



Temperature
17° C – 37° C



Ecological
Restoration
Alliance

Overview

The Malabar Coast Moist Forests extends along most of the western peninsular coast of India. These forests are sandwiched between the coastline and the rising escarpment of the Western Ghats. Sharing a lot of similarities with the North and South Western Ghats Moist Deciduous Forests ecoregions, this belt once held dense contiguous tracts of tall-stature dipterocarp dominated multi-layered evergreen and semi-evergreen forests. West-flowing peninsular river systems pass through and form estuaries in this landscape forming broad swamps, lagoons, deltas and tide-influenced 'backwater' zones with large sediment deposits. Very few representative protected areas or reserves remain in this ecoregion which has seen centuries of human land use and anthropogenic pressures as it functioned as a centre for overseas trade and commerce. Little is documented about the pockets that remained but historical records and biogeographic inferences suggest that these forests would have been highly diverse and been an important home to diverse flora and fauna.

Adjoining ecoregions

Along most of its latitudinal extent this ecoregion shares its boundaries and transitions into the **South Western Ghats Moist Deciduous Forests** and the **North Western Ghats Moist Deciduous Forests**. Along the central sections of the Western Ghats this



Moist forests on an even terrain bordered by water bodies; the west coast, India.

ecoregion transitions directly into the **North Western Ghats Montane Rainforests** and meets the trailing end of the **Southern Western Ghats Montane Rainforest**.

Geography

This ecoregion forms an extended belt along the majority of the west coast of India extending 1400 km from the sediment islands and deltas of Bombay (Mumbai) down to the tip of the peninsula at Kanyakumari. Its span falls in Maharashtra, Karnataka, and Kerala and extends into Tamilnadu spanning 35,540 km². The coastal wet climate extends a few kilometres inland from the coast, from sea level to an elevation of 250 m, where the ecoregion meets the rising slopes of the Ghats. The landscape is mostly flat and gently undulating in nature, uniform in topography features with small hills and isolated mounds being the only distinct features. typified by numerous backwater lagoons, swamps and all west-flowing broad, short, fast-flowing rivers originating from the crests of the Western Ghats. Major river systems include the Periyar, Bharathapuzha, Pamba, Netravati, Sharavathi, Kali, Mandovi, and Zuari rivers. Along with hundreds of smaller tributaries, these rivers carry large quantities of sediment into broad estuaries. The landscape is gently undulating and in large part predominantly.

Geology and Soil

The majority of soils that make up the southern extents of this ecoregion are of fine sediment-nutrient rich alluvial and lateritic in nature. These soils are replaced by the broader Deccan Trap formations with large heavily eroded horizontal shelves of basaltic lava that taper down to meet the coast. The mid sections form a complex mosaic of small belts of Quilon limestone beds along the coast, interspersed with alluvial, granitic intrusions and a mixture of other clusters of peninsular gneissic formations. Swamps, lagoons, depressions and valleys hold waterlogged, anaerobic fine silted aggregate-sediment beds.

Climate

The climate is distinctly high in humidity with warm temperatures typical of tropical coasts that show little variation through the year varying from 28 – 35°C . Rainfall is high but lower than along the slopes and crests of the Ghats increasing in overall precipitation amount when moving further inland. Annual rainfall is quite variable between years and over spatial-temporal boundaries, varying between 2000 mm and 6000 mm with an approximate average of 2800 mm. The major source of annual



Canopy[left to right]: *Diospyros candolleana*, *Dipterocarpus indicus*, *Kingiodendron pinnatum*, *Neolamarckia cadamba*



Sub-Canopy[left to right]: *Glochidion ellipticum*, *Dillenia pentagyna*, *Kydia calycina*, *Litsea coriacea*



Shrubs[left to right]: *Holarrhena pubescens*, *Maesa indica*, *Pavetta tomentosa*, *Breynia retusa*



Lianas[left to right]: *Artabotrys zeylanicus*, *Calycopteris floribunda*, *Merremia tridentata*, *Argyreia nervosa*

rainfall is the southwest monsoon between June and September with an average of a 100 – 140 days under precipitation as large cloud systems get intercepted by the ridge of the Western Ghats concentrating and trapping rainfall over short distances. Additional precipitation is received through conventional thundershowers during the hotter summer months between March and May.

Natural vegetation

The Malabar coast has been subject to extensive land use and anthropogenic pressure over centuries leading to a disappearance of most of the forests that would have once extended as tall stature contiguous evergreen to semi-evergreen forest belts as an extension of moist deciduous forests in the Ghats. In the current context, it is a challenge to identify the plant community composition of the Malabar coast. The diversity of this moist forest ecosystem is likely to share much similarity in species numbers and type with the northern and southern moist deciduous forests. However the forest structure and proportions of these species in the community remains a relative mystery due to the lack of existing, representative forest stands apart from select pockets.

There are, however, some inferences that can be drawn from existing information. This forest type likely had a four-storeyed structure with tall emergent dipterocarp trees (*Dipterocarpus indicus*, *Dipterocarpus bourdillonii*) playing a prominent role followed by a dense stand of canopy (*Kingiodendron pinnatum*, *Humboldtia brunonis*, *Persea macrantha*), sub-canopy (*Diospyros oocarpa*, *Anacolosa densiflora*, *Diospyros candolleana*) and understory trees and shrubs with a high abundance and diversity of liana species as well. These dense, tall forest tracts would have been interspersed with *Myristica spp.* and *Pandanus* swamps in valleys and depressions closer to the coast and tidal backwaters.

Variation within ecoregion

This ecoregion transitions through several latitudinal zones along its nearly 1500 km extent. Similar to the zonation patterns of the Western Ghats escarpments, the landscape becomes more seasonal and drier with longer summer droughts characterised by a lower amount of annual rainfall days when moving higher in latitude. This change in climate has significant impacts on species composition. Southern reaches of the Malabar Coast Moist Forests are more likely to hold more

wet forest evergreen species like *Dipterocarpus bourdillonii*, *Anacolosa densiflora*, *Kingiodendron pinnatum*, *Humboldtia brunonis* while northern regions exhibit more deciduous species that have adapted to less moisture availability; e.g., *Diospyros oocarpa*, *Xylia xylocarpa*, *Diospyros candolleana*, *Persea macrantha*, *Holigarna spp.*, *Terminalia spp.* Thus forest types show a transition to more deciduous species communities from more evergreen species further south. Apart from latitudinal temporal variations, distance from the coast may have also had significant impacts in changing stand structure, species composition and overall forest type.



A panorama of Bombay from Malabar hill; William Henry Carpendale (1830-1883)

Plant seasonality

There are no studies available specifically on the annual phenology of the moist forests of the coast, thus the table portrays information from the closely-related neighbouring ecoregions; the North and South Western Ghats Moist Deciduous Forests. Since a majority of the species are shared between these forest types the inherent seasonality and cycles of the plants are likely to be similar.

Pollination and seed dispersal ecology

Most flowers are generalist in nature with multiple groups of fauna pollinating and visiting several different species. Most deciduous forest trees produce copious amounts of nectar and thus are mainly pollinated by birds and hymenopterans, and less often by other insect

Characteristic native plant species

Trees

Canopy

Actinodaphne malabaricum
Adina cordifolia
Anacolosa densiflora
Antidesma acidum
Aporosa lindleyana
Bauhinia malabarica
Bombax ceiba
Bridelia airy-shawii
Careya arborea
Casearia ovata
Diospyros candolleana
Diospyros oocarpa
Dipterocarpus indicus
Ficus amplissima
Ficus drupacea

Ficus racemosa
Ficus religiosa
Holigarna spp.
Hopea parviflora
humboldtia brunonis
Hydnocarpus laurifolia
Kingiodendron pinnatum
Lagerstroemia hirsuta
Macaranga peltata
Mangifera indica
Melia dubia
Meyna laxiflora
Miliusa tomentosa
Neolamarckia cadamba
Persea macrantha

Schleichera oleosa
Syzygium cumini
Terminalia bellirica
Terminalia arjuna
Tetrameles nudiflora
Xylia xylocarpa

Sub-Canopy

Buchanania lanzan
Chionanthus mala-elengi
Cordia obliqua
Dillenia pentagyna
Diospyros nigrescens
Erythrina stricta
Glochidion ellipticum
Glochidion tomentosum
Haldina cordifolia
Kydia calycina
Lannea coromandelica
Litsea coriacea
Litsea glutinosa
Madhuca neriifolia
Olea dioica
Ougeinia oojeinensis
Stereospermum colais

Characteristic native plant species










Shrubs

Allophylus rheedii
Balanites aegyptiaca
Breynia retusa
Gnidia glauca
Holarrhena pubescens
Maesa indica
Murraya koenigii
Pavetta crassicaulis
Pavetta tomentosa
Pothomorphe subpeltata
Sarcostigma kleinii
Solanum torvum

Lianas

Argyreia nervosa
Artabotrys zeylanicus
Asparagus racemosus
Calamus gamblei
Calycopteris floribunda
Clematis gouriana
Cryptolepis buchanani
Cyclea peltata
Dioscorea pentaphylla
Hemidesmus indicus
Jasminum malabaricum
Merremia tridentata
Piper argyrophyllum
Tragia hispida
Tylophora macranthus
Vigna umbellata

Plant seasonality

J	F	M	A	M	J	J	A	S	O	N	D
											
											
											

orders. Of the trees, two thirds of the fruits are dispersed by animals while most others are wind-dispersed species. Animal fruits are predominantly dispersed by birds, primates, large mammals, small carnivores like palm civets, and bats.

Animal life

There is little documentation on the faunal communities but it is likely to share significant similarities with those of the moist deciduous forests of the Western Ghats being home to important populations of large mammal species such as elephants, gaur, bears and tigers. Important remnant protected areas within this ecoregion hold significant populations of leopards and wild dogs with diverse bird and insect populations.

Conservation

Much of what would have once been contiguous dense tracts of forests has largely been converted to human settlements and agricultural land over several centuries. Only a handful of protected areas exist in this area and a majority of these areas are in themselves subject to disturbance and compositional change due to anthropogenic pressures such as logging, fuelwood, construction and urbanisation, and agriculture. The Malabar coast is home to high densities of human populations and supports many important agrarian, trading, industrial, and tourist sectors.

Important Protected Areas in the Ecoregion

Munderi Kadavu Bird sanctuary, Peechi-Vazhani Wildlife sanctuary, Kalanjimale forest, Mugali marine protected area, Phansad wildlife sanctuary, Sanjay Gandhi National Park, Tungareshwar Wildlife sanctuary.

Ecological Restoration Projects in the Ecoregion

We are currently not aware of any projects located in this ecoregion. Please mail us on hello@era-india.org if you know of any projects that could be listed here.

Acknowledgements

We want to thank the following individuals and organisations for their contributions and efforts that helped us make this document

Text

A. P. Madhavan

Editors

T. R. Shankar Raman

Design

Arjun Singh
Janhavi Rajan

Images (CC-BY / CC-BY-SA via Wikimedia Commons)

[cover] Ecoregion Map: A. P. Madhavan

[Pg 1] Western Ghats Lake Forest Nature Scene, India
December 2013; Navaneeth KN

[Pg 3] *Diospyros candolleana*; Vinayraj

[Pg 3] *Dipterocarpus indicus*; A. P. Madhavan

[Pg 3] *Kingiodendron pinnatum*; Siddarth Machado

[Pg 3] *Neolamarckia cadamba*; Raju Kasambe

[Pg 3] *Glochidion ellipticum*; Mrinalini K Siddhartha

[Pg 3] *Dillenia pentagyna*; A. J. T. Johnsingh

[Pg 3] *Kydia calycina*; Dinesh Valke

[Pg 3] *Litsea coriacea*; Dinesh Valke

[Pg 3] *Holarrhena pubescens*; Dinesh Valke

[Pg 3] *Maesa indica*; Dinesh Valke

[Pg 3] *Pavetta tomentosa*; Yercaud-elango

[Pg 3] *Breynia retusa*; Dinesh Valke

[Pg 3] *Artabotrys zeylanicus*; Dinesh Valke

[Pg 3] *Calycopteris floribunda*; Dinesh Valke

[Pg 3] *Merremia tridentata*; Renjusplace

[Pg 3] *Argyreia nervosa*; Rison Thumboor

[Pg 5] A panorama of Bombay from Malabar hill;
William Henry Carpendale (1830-1883)

Icons

[cover] Creative Commons by Austin Condif from
NounProject.com

[cover] Cc By by H Alberto Gongora from NounProject.com

[Pg 7] Leaf by Arthur Shlain from NounProject.com

[Pg 7] Flower by Eucalyp from NounProject.com

[Pg 7] Orange by Iconic from NounProject.com

Key References

Ramesh, B. R. & Pascal, J. P. 1997. *Atlas of Endemics of the Western Ghats (India): Distribution of Tree Species in the Evergreen and Semi-Evergreen Forests*. Institut Français de Pondichéry, Pondicherry.

Pascal, J. P. 1988. *Wet evergreen forests of the Western Ghats of India: ecology, structure, floristic composition and succession*. Institut français de Pondichéry, Pondichéry.

Davidar, P., Rajagopal, B., Mohandass, D., Puyravaud, J.-P., Condit, R., Wright, S.J. & Leigh, E.G., Jr 2007. The effect of climatic gradients, topographic variation and species traits on the beta diversity of rain forest trees. *Global Ecology and Biogeography* 16: 510-518.

Sundarapandian, S.M. & Swamy, P. S. 2000. Forest ecosystem structure and composition along an altitudinal gradient in the Western Ghats, South India. *Journal of Tropical Forest Science* 1: 104-23.

Wikramanayake, E., Dinerstein, E., Loucks, C. J., Olson, D. M., Morrison, J., Lamoreux, J., McKnight, M. & Hedao, P. 2002. *Terrestrial Ecoregions of the Indo-Pacific: A Conservation Assessment*. Island Press, Washington, DC.

One Earth Ecoregion Snapshot

<https://www.oneearth.org/ecoregions/malabar-coast-moist-forests/>



Ecological
Restoration
Alliance

www.era-india.org

Version 1.0, 16 May 2023

SUGGESTED CITATION

ERAIndia (2023). Ecoregion Profile: Malabar Coast Moist Forests. Version 1.0. Ecological Restoration Alliance, India. 12 pages.

<https://era-india.org/resources/Malabar-Coast-Moist-Forests>



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

You are free to copy, distribute, display, remix, adapt, and build on this work provided you give appropriate credit.