

Chapter No.- 04

**Biodiversity and its
conservation**

Definition- Biodiversity refers to the variety and variability among all living organism with ecosystem complexes in which they occurs.

OR

The totality of the genes, the species and ecosystem in a given region.

OR

The vast range of life form from simple, microscopic and unicellular to the complex, evolved and multicellular life forms on earth.











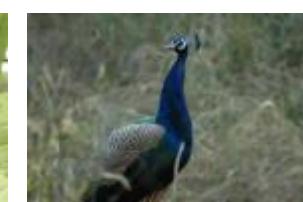
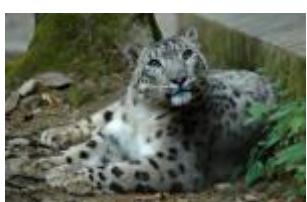








Different types of animal species:-



Different types of plant species



Levels of Biodiversity

1) Genetic Diversity:- When the Genes within the same species shows different version due to new combination .Then it is called as genetic diversity.

A) e. g. Rice crop plant.

- 1) Ratnagiri 24 rice
- 2) Basmati rice
- 3) Delhi rice
- 4) Indrayani rice
- 5) HMT rice



(Differ in shape, size, color, aroma, nutrient value)

B) Sugarcane plant

- e.g. 1) CO- 8011
2) CO- 86032
3) CO-740
4) CO-265
5) CO-671



C)e.g:- Rose Flowers

D) Variety of cows:-

e.g. New Holland, Hosten, HF, Jaurcy ,Bangalore, Triveni

(Differ in shape ,size, color, total milk production)

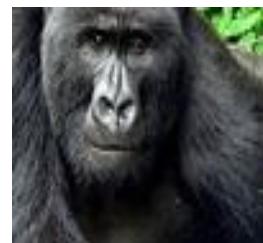


2) Species diversity:-

A number of species present in a system is called as species diversity.

Species is smallest unit of classification.

According to Wilson (1992) On earth surface about 10 to 50 million plant & animal species are present. These different varieties of plants, animals and microorganism in a given region is called as species diversity.



C)Ecosystem Diversity:-

Variation in biological communities

The variability among different types of ecosystem are called as ecosystem diversity.

Terrestrial Ecosystem



Forest Ecosystem



Grassland ecosystem



Desert ecosystem

Aquatic Ecosystem-



River Ecosystem



Marine Ecosystem



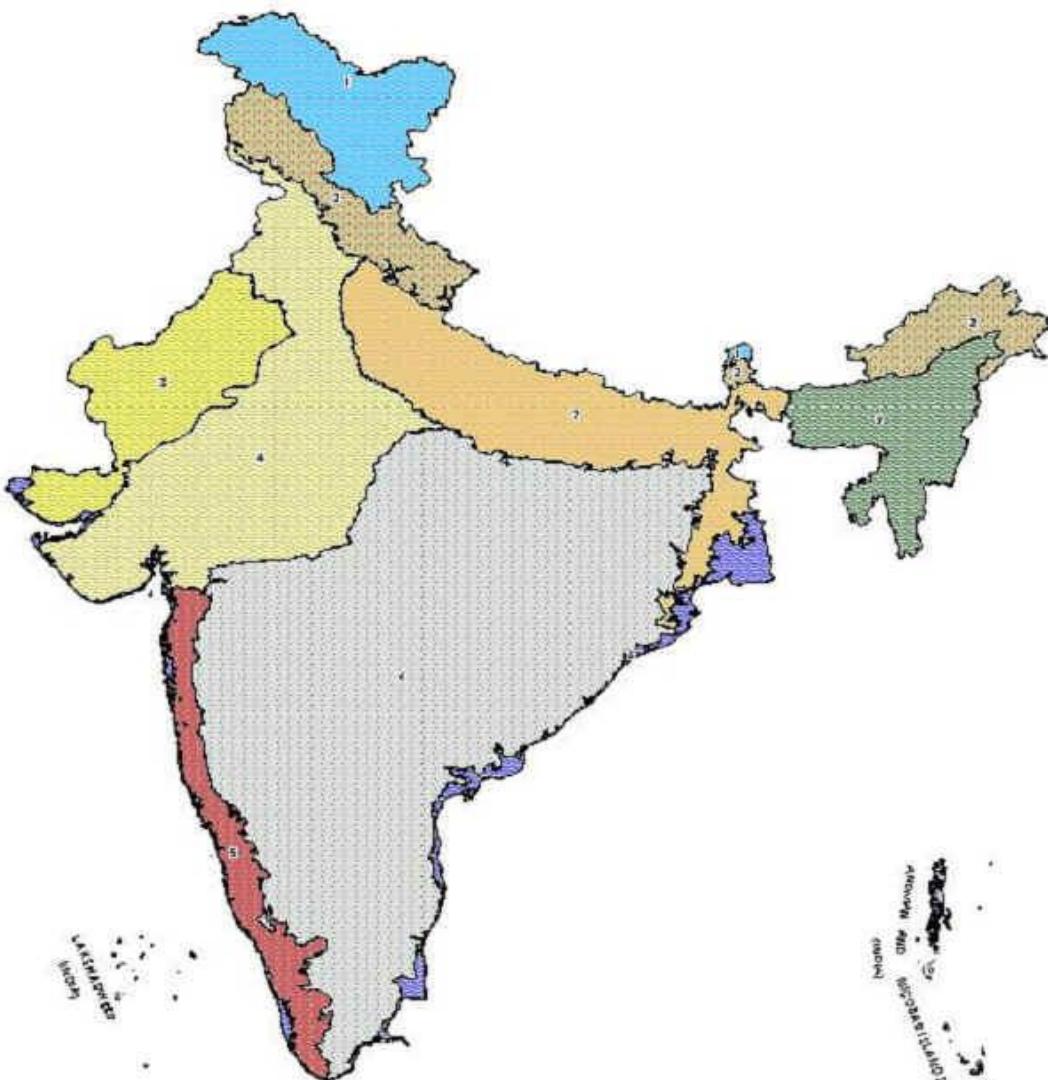
Lake Ecosystem

Biogeographical classification of India

Biogeographical classification of India

Sr.No.	Regions
01	Trans Himalayan
02	Himalayan
03	Arid Area
04	Semi-arid area
05	Western Ghats
06	Deccan Peninsula
07	Gangetic Plain
08	North-East India
09	Sea Coasts
10	Islands

Biogeographical classification of India :-



Based upon Survey of India map
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The territorial waters of India extend to a distance of
twelve nautical miles measured from the appropriate baseline.

Biogeographic Classification of India : Zones

	%
1: Trans-Himalaya	5.6
2: Himalaya	6.4
3: Desert	6.6
4: Semi-Arid	16.6
5: Western Ghats	4.0
6: Deccan Peninsula	42.0
7: Gangetic Plain	10.8
8: Coasts	2.5
9: North-East	5.2
10: Islands	0.3

* Represents percentage of the total geographical area of India : 3287263 sq. km

The Biogeographic Classification of India recognizes 10 Biogeographic Zones ranging from the Trans-Himalaya to the Islands. These zones indicate a unique set of geo-physical and hydro-climatic conditions as well as distinct geological origins. They also have unique floral and faunal elements. The Himalaya and Gangetic Plain are examples of two adjacent but extremely different zones.

The Biogeographic Classification is sufficiently detailed with a distinctive hierarchy of units, to facilitate conservation planning at national and intra-state levels. The scheme is comparable with other international classifications and is also compatible with other landuse planning classifications in India.



0 100 200 300 400 500 600 700 800 900 1000
Kilometers



विज्ञान वन्यजीव संस्थान
Wildlife Institute of India
GIS Cell, March 2000

Sources: Rodgers, Panwar & Mathur (2000)



India Biogeographic Zones (Biogeographic zone)

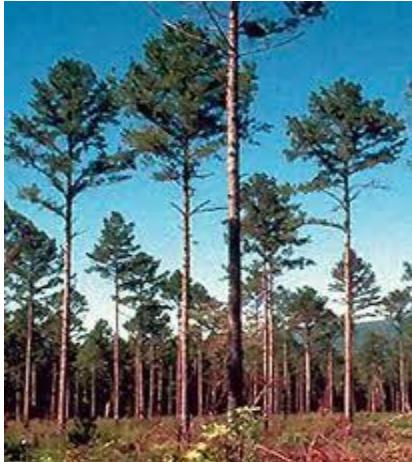
- Coasts
- Deccan Peninsula
- Desert
- Gangetic Plain
- Himalaya
- Islands
- North-East
- Semi-Arid
- Trans-Himalaya
- Western Ghats

Map of India displaying geographic regions as affecting its bio-diversity



1) Trans Himalayan- Total area – 1,86,200 Sq.Km.

The cold mountainous snow covered Trans Himalayan region of Ladakh.



Pine Tree



Deodar



f



Wild sheep



Yak



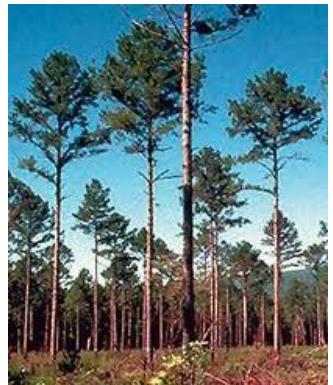
Tibetan ass



Snow leopard



Black-necked crane



Pine



Cork Tree



Sal tree



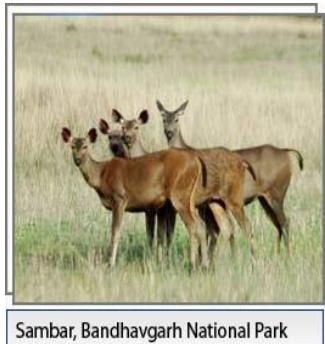
Dhak tree



Castor



Wild bear



Sambar



Leopard



Sikkim stag



Musk deer

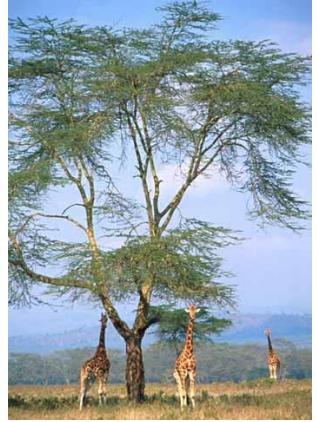
2) Himalayan- Total area - 9,32,900 Sq.Km. The Himalayan ranges and valleys of Kashmir, Himachal Pradesh, Uttarakhand, Assam and other North Eastern States.

3) Desert region - Total area -2,25,000 Sq.Km.

The Thar Desert of Rajasthan



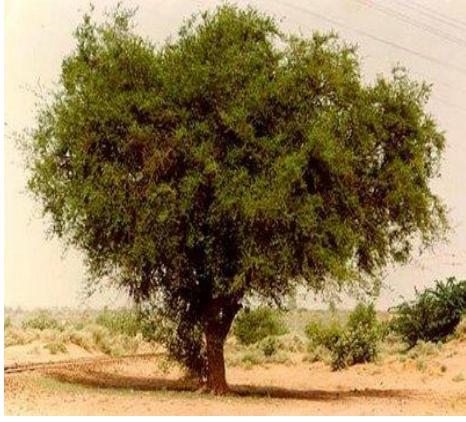
©Gunther Deichmann



Acacia tree



Zizyphus tree



Khejri Tree



Date palm



Camel



Bastard



Desert cat



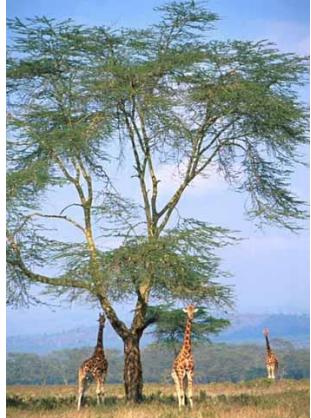
Fox



Desert Rat

4) Semi-desert – Total area – 5,08,000 Sq.Km.

The semi arid grassland region of the Deccan plateau Gujarat, Maharashtra, Andra Pradesh, Karnataka and Tamil Nadu.



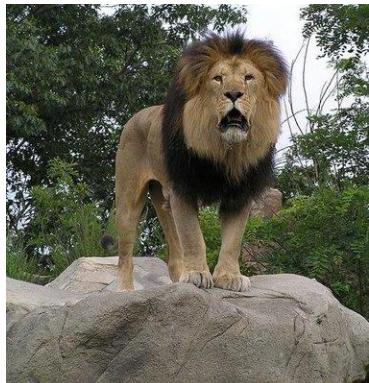
Acacia



Date Palm



Peepal Tree



Gir lion



Tigress

5) Western Ghat – Total area - 1,59,000 Sq.Km.

The Western Ghats in Maharashtra,
Karnataka and Kerala.



Sheesham tree



Peepal tree



Tuna tree



Bahera tree



Tortoise



Frog

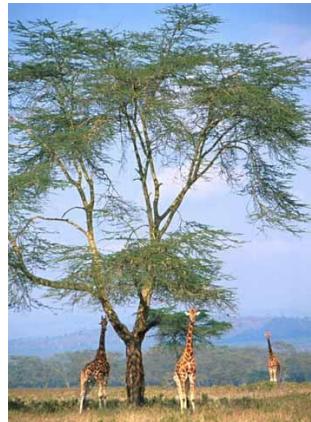


Lizards



Snakes

6) Deccan Peninsula - Total area 14,21,000 Sq.Km.



Acacia



Palash tree



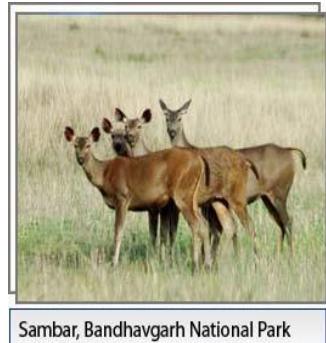
Tuna tree



Pine tree



Wild elephant



Sambar, Bandhavgarh National Park



Sloth bear



Tiger



Cheetal



Four horned stag

7) Gangetic Plain - Total area - 3,59,000 Sq.Km.

The Terai, the lowland where the Himalayan rivers flow into the plains.



Sal



Acacia



Jamun



Mango



Beal



Black Chinkara Stag



Rhinoceros



Gazzel



Turtle

8) North East India - Total area- 1,71,400 Sq.Km.



Bamboo



Sal tree



Jack fruit



Elephant



Rhinoceros



Porcupine

9) Islands - Total area - 8507 Sq.Km.

The Andaman and Nicobar Islands.



Bahera



Harar tree



jack fruit



Cardamom plant



coconut



Dolphin



Alligator / crocodile



Molluscus

10) Sea Coasts - Total area 13,000 Sq.Km

The long western and eastern coastal belt with sandy beaches, forests and mangroves.



Coconut



jack fruit



banana



Dugong



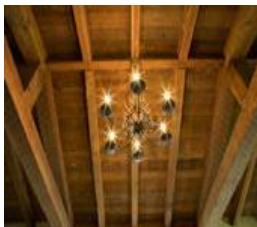
Dolphin



crocodile

Values of Biodiversity

1) Consumptive use value:- food, fodder, medicine ,timber, fuel wood ,fire wood, Gum. Resin, Lac, Bamboo canes milk, Pulses ,Vegetables Meat ,Eggs, Food grains ,Honey etc





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Penicillin fungus used as Antibiotic



Digitalin drug- Foxglove tree used in Heart Diseases



Quinine drug - used as Antimaleria drug.
obtained from bark Cinchona tree



Vinblastin & Vincristin drug used
Anticancer obtained from
Periwinkle tree



Jaborandi plant sp.



Reduce pressure in eyes

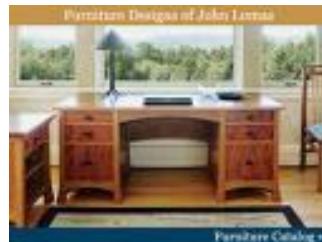


Curare vine plant –
Relaxes muscles during surgery



Papaya- Dissolved excess
Proteins & mucus

2) Productive use value:- From Timber



Furniture's



Tusk of elephant



Musk of deer



Wool from sheep



fur from animals

Paper & pulp ,Textile, Ivory works, Plywood ,Leather,Pearl,Tannery industries depend on productive value of biodiversity.

3) Social value:-

Various types of plants and animals related spiritual aspect of some people.



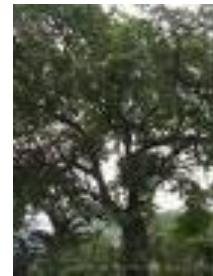
Neem



Ficus tree(Vad)



Mango tree



Bael tree



Lotus flower



Cow



Ox



Snake



Tortoise



Owl



Peacock

4) Ethical Value:-

Also called as “ existence value”.

Ethical issues involves “**All life must be preserved**”

Depend upon the concept “**Live and let live**”

e.g.

- We do not get anything from **Zebra**, kangaroo & Giraffe but we strongly feel they should exist or survive on the earth.



Giraffe



Zebra



kangaroo

5) Option value:- According to IUCN “option value of biodiversity is nothing but potential value of biodiversity for future use ”



6) Aesthetic value:-

Nature is very beautiful and wonderful.

Some peoples also visit to nature for Enjoying, hunting, tracking ,hiking, wildlife watching, bird watching.



Ecotourism



Scientist

Writers

Painter

7) Ecological value:-

- 1) Production of oxygen
- 2) Sink of CO₂
- 3) Wildlife habitat
- 4) Prevents the soil erosion.
- 5) Prevents the flood condition.
- 6) Prevents the drought condition
- 7) Act as moderator of the Environmental Pollution.
- 8) Maintain the hydrological cycle.
- 9) Recharge the ground water.

8) National Value:-

- National Animal- Tiger
- National Bird – Peacock
- National Flowers - Lotus



Hot spots of Biodiversity

North and Central America

California Floristic Province

Caribbean Islands

Madrean pine-oak woodlands

Mesoamerica

South America

Atlantic Forest

Cerrado

Chilean Winter Rainfall-Valdivian Forests

Tumbes-Chocó-Magdalena

Tropical Andes

Europe and Central Asia

Caucasus

Irano-Anatolian

Mediterranean Basin

Mountains of Central Asia

Africa

[Cape Floristic Region](#)

[Coastal Forests of Eastern Africa](#)

[Eastern Afromontane](#)

[Guinean Forests of West Africa](#)

[Horn of Africa](#)

[Madagascar and the Indian Ocean Islands](#)

[Maputaland-Pondoland-Albany](#)

[Succulent Karoo](#)

[Asia-Pacific](#)

[East Melanesian Islands](#)

[Eastern Himalaya](#)

[Indo-Burma](#)

[Japan](#)

[Mountains of Southwest China](#)

[New Caledonia](#)

[New Zealand](#)

[Philippines](#)

[Polynesia-Micronesia](#)

[Southwest Australia](#)

[Sundaland](#)

[Wallacea](#)

[Western Ghats](#) and [Sri Lanka](#)



KEY

- | | | |
|---|--|--|
| 1. TROPICAL ANDES | 10. MESOAMERICA | 19. CALIFORNIA
FLORISTIC PROVINCE |
| 2. SUNDALAND | 11. BRAZILIAN CERRADO | 20. SUCCULENT KAROO |
| 3. MEDITERRANEAN BASIN | 12. SOUTHWEST AUSTRALIA | 21. NEW ZEALAND |
| 4. MADAGASCAR AND
INDIAN OCEAN ISLANDS | 13. MOUNTAINS OF SOUTH-
CENTRAL CHINA | 22. CENTRAL CHILE |
| 5. INDO-BURMA | 14. POLYNESIA/MICRONESIA | 23. CAUCASUS |
| 6. CARIBBEAN | 15. NEW CALEDONIA | 24. WALLACEA |
| 7. ATLANTIC FOREST REGION | 16. CHOCO-DARIEN/WESTERN ECUADOR | 25. EASTERN ARC MOUNTAINS/
COASTAL FORESTS OF
TANZANIA AND KENYA |
| 8. PHILIPPINES | 17. GUINEAN FORESTS OF WEST AFRICA | |
| 9. CAPE FLORISTIC PROVINCE | 18. WESTERN GHATS/SRI LANKA | |

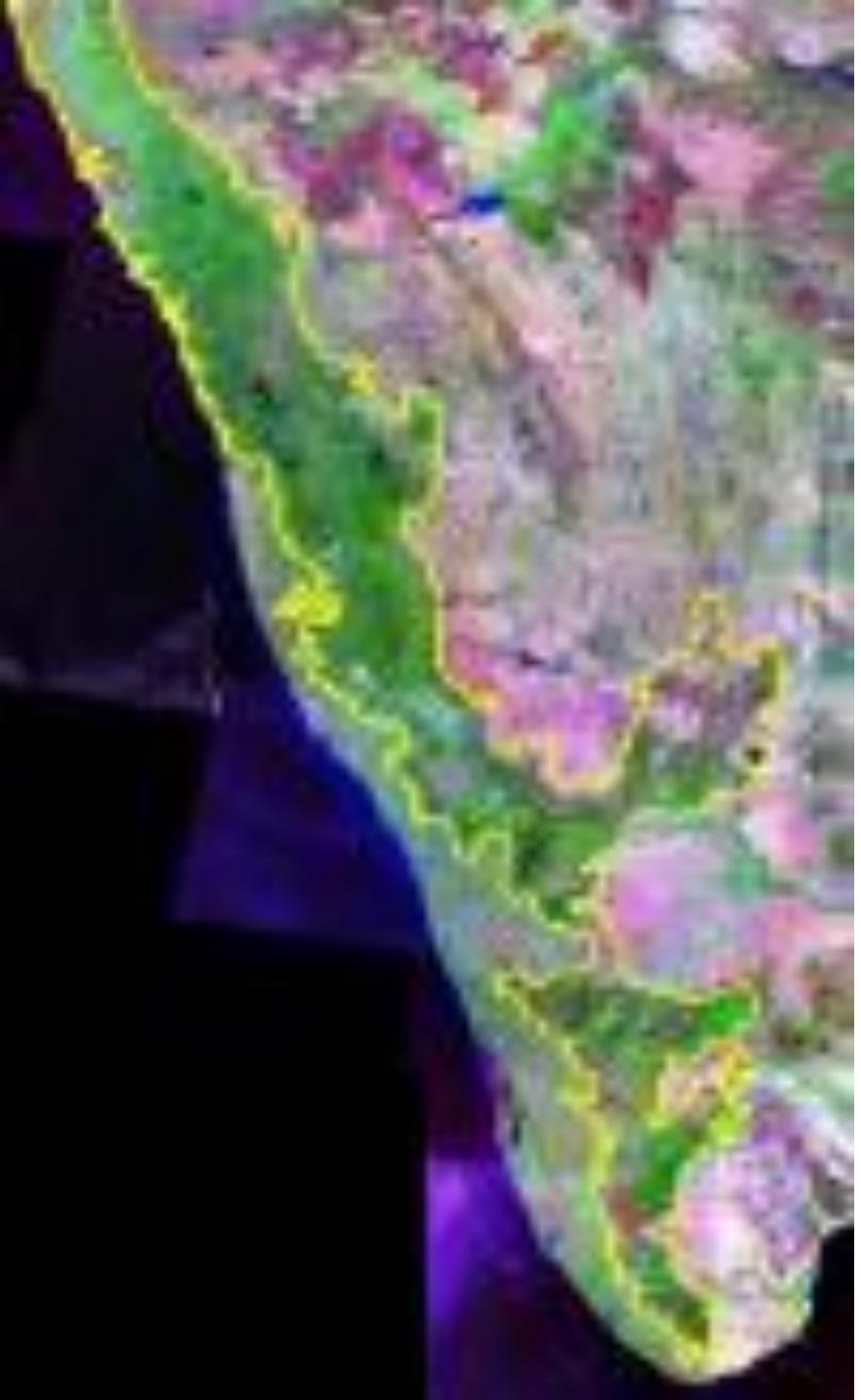


Eastern Himalaya



Western Ghats

Western Ghats











Rainforests near Madikeri, Coorg district, Western Ghats

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12 12 2006





The Western Ghats as a biodiversity region-

- Western Ghats locally known - Sahyadri
- Origin – From mouth of the river Tapi in Dhule districts to Kanyakumari
- Total length – 1600 Km. parallel to west coast
- Total Area – 1,60,000 Sq. Km.
- Total population support – 45 million
- River originated – Krishna , Bhīma, Tungabhadra, Kaveri , Kali , Saraswati
 - Which provides 200 billion cubic meters of water.
- Annual Rainfall – 2000 – 7000 mm.(80% during monsoon)
- Plant species (Forest) – Evergreen , Semi-evergreen .moist and dry deciduous and sub tropical hill forest .
 - Full of biodiversity.

Mountains-

- The Western Ghats extend from the [Satpura Range](#) in the north, go south past [Goa](#), through [Karnataka](#) and into [Kerala](#) and [Tamil Nadu](#). The major hill range starting from the north is the *Sahyadri (the benevolent mountains)* range. This range is home to many [hill](#)
- [stations](#) like [Matheran](#), [Lonavala](#)-
[Khandala](#), [Mahabaleshwar](#), [Panchgani](#), [Amboli](#) Ghat, [Kudremukh](#) and [Kodagu](#). The range is called *Sahyadri* in northern [Maharashtra](#) and *Sahya Parvatam* in Kerala. The [Bili giri rangana Betta](#) southeast of [Mysore](#) in [Karnataka](#), meet the [Shevaroys](#) (Servarayan range) and [Tirumala](#) range farther east, linking the Western Ghats to the [Eastern Ghats](#). In the south the range is known as the *Nilagiri malai* in [Tamil Nadu](#).
- Smaller ranges, including the [Cardamom Hills](#) and the [Nilgiri Hills](#), are in northwestern [Tamil Nadu](#). The Nilgiri Hills are home to the hill station [Ootacamund](#). In the southern part of the range in the [Anaimalai Hills](#), in western Tamil Nadu and Kerala, [Ana Mudi](#) 2,695 metres (8,842 ft) is the highest peak in Western Ghats. [Chembra Peak](#) 2,100 metres (6,890 ft), [Banasura Peak](#) 2,073 metres (6,801 ft), [Vellarimala](#) 2,200 metres (7,218 ft) and [Agasthya mala](#) 1,868 metres (6,129 ft) are also in Kerala. Doddabetta is 2,637 metres (8,652 ft). [Mullayanagiri](#) is the highest peak in Karnataka 1,950 metres (6,398 ft). The Western Ghats in Kerala is home to many [tea](#) and [coffee plantations](#).

- The major gaps in the range are the Goa Gap, between the Maharashtra and Karnataka sections, and the [Palghat Gap](#) on the Tamil Nadu/Kerala border between the Nilgiri Hills and the Anaimalai Hills.
- The northern portion of the narrow coastal plain between the Western Ghats and the Arabian Sea is known as the [Konkan Coast](#) or simply [Konkan](#), the central portion is called [Kanara](#) and the southern portion is called [Malabar region](#) or the [Malabar Coast](#). The foothill region east of the Ghats in [Maharashtra](#) is known as [Desh](#), while the eastern foothills of the central Karnataka state is known as [Malenadu](#).^[7] The largest city within the mountains is the city of [Pune](#) ([Poona](#)), in the Desh region on the eastern edge of the range. The [Biligirirangan Hills](#) lies at the [confluence](#) of the Western and [Eastern Ghats](#).
- The mountains intercept the rain-bearing westerly [monsoon](#) winds, and are consequently an area of high rainfall, particularly on their western side. The dense forests also contribute to the precipitation of the area by acting as a substrate for condensation of moist rising [orographic](#) winds from the sea, and releasing much of the moisture back into the air via [transpiration](#), allowing it to later condense and fall again as rain.

Peaks

- Salher (Maharashtra), Kalsubai (Maharashtra), Mahableshwar (Maharashtra), Sonsogor (Goa), Kemmangundi (Karnataka), Tadiandamol (Karnataka), Mullayanagiri (Karnataka), Kudremukh (Karnataka), Pushpagiri (Karnataka), Kumara Parvatha (Karnataka), Doddabetta (Tamil Nadu) & Anai Mudi (Kerala).
- Lakes and reservoirs
- The Western Ghats have several manmade lakes and reservoirs. The well known lakes are the Ooty (2500 m altitude, 34.0 ha) in Nilgiris, and the Kodaikanal (2285 m, 26 ha) and the Berijam in the Palni Hills. All lakes are situated in the state of Tamil Nadu. Two smaller lakes, the Devikulam (6.0 ha) and the Letchmi Elephant (2.0 ha) are in the Munnar range, and the Yercaud lake (1340 m, 8 ha) in Shevaroy Hills.

Rivers

- The Western Ghats form one of the three watersheds of India, feeding the perennial rivers of India. Important rivers include the Godavari, Krishna, and Kaveri. These rivers flow to the east and drain out into the Bay of Bengal. The west flowing rivers, that drain into the Arabian Sea, are fast-moving, owing to the short distance travelled and steeper gradient. Important rivers include the Mandovi and Zuari. Many of these rivers feed the backwaters of Kerala and Maharashtra. Rivers that flow eastwards of the Ghats drain into the Bay of Bengal. These are comparatively slower moving and eventually merge into larger rivers such as the Kaveri and Krishna. The larger tributaries include the Tunga River, Bhadra river, Bhima River, Malaprabha River, Ghataprabha River, Hemavathi river, Kabini River. In addition there are several smaller rivers such as the Chittar River, Manimuthar River, Kallayi River, Kundali River, Pachaiyar River, Pennar River, Periyar and the Kallayi River.

Dams and hydroelectric power projects:-

- Fast running rivers and steep slopes have provided sites for many large hydro-electric projects. There are about major 50 dams along the length of the Western Ghats with the earliest project up in 1900 near [Khopoli](#) in Maharashtra.^[9] Most notable of these projects are the [Koyna Dam](#) in Maharashtra, the [Parambikulam Dam](#) in Kerala, and the [Linganmakki Dam](#) in Karnataka.^[10] The reservoir behind the Koyna Dam, the [Shivajisagar Lake](#), has a length of 50 [km](#) (31 [mi](#)) and depth of 80 [m](#) (262 [ft](#)).^[11] It is the largest hydroelectric project in Maharashtra, generating 960 MW of electric power.^[12]

Falls-

- . Among the most well known is the [Jog Falls](#), [Kunchikal Falls](#), [Sivasamudram Falls](#), and [Unchalli Falls](#).

Climate-

- Climate in the Western Ghats varies with altitudinal gradation and distance from the equator. The climate is humid and tropical in the lower reaches tempered by the proximity to the sea. Elevations of 1,500 [m](#) (4,921 [ft](#)) and above in the north and 2,000 [m](#) (6,562 [ft](#)) and above in the south have a more temperate climate. Average annual temperature here are around 15 °C (60 °F). In some parts frost is common, and temperatures touch the freezing point during the winter months. Mean temperature range from 20 °C (68 °F) in the south to 24 °C (75 °F) in the north. It has also been observed that the coldest periods in the south western ghats coincide with the wettest.
- During the [monsoon season](#) between June and September, the unbroken Western Ghats chain acts as a barrier to the moisture laden clouds. The heavy, eastward-moving rain-bearing clouds are forced to rise and in the process deposit most of their rain on the windward side. Rainfall in this region averages 3,000–4,000 mm (120–160 in) with localized extremes touching 9,000 mm (350 in).

- The eastern region of the Western Ghats which lie in the rain shadow, receive far less rainfall averaging about 1,000 mm (40 in) bringing the average rainfall figure to 2,500 mm (150 in). Data from rainfall figures reveal that there is no relationship between the total amount of rain received and the spread of the area. Some areas to the north in Maharashtra while receiving heavier rainfall are followed by long dry spells, while regions closer to the equator receiving less annual rainfall, have rain spells lasting almost the entire year.

Forests

- tropical and subtropical moist broadleaf forest ecoregions – North Western Ghats moist deciduous forests, North Western Ghats montane rain forests, South Western Ghats moist deciduous forests, and South Western Ghats montane rain forests. North Western Ghats montane rain forests, South Western Ghats moist deciduous forests, South Deccan Plateau dry deciduous forests, South Western Ghats montane rain forests

protected areas-

- The [Government of India](#) established many [protected areas](#) including 2 [biosphere reserves](#), 13 [National parks](#) to restrict human access, several [wildlife sanctuaries](#) to protect specific endangered species and many [Reserve Forests](#), which are all managed by the forest departments of their respective state to preserve some of the ecoregions still undeveloped. Many National Parks were initially Wildlife Sanctuaries. The [Nilgiri Biosphere Reserve](#) comprising 5500 km² of the evergreen forests of [Nagarahole](#), deciduous forests of [Bandipur National Park](#) and Nugu in Karnataka and adjoining regions of [Wayanad](#) (ഓവാൻഡ) and [Mudumalai National Park](#) in the states of [Kerala](#) and [Tamil Nadu](#) forms the largest contiguous protected area in the Western Ghats.^[16] The Western Ghats in Kerala is home to numerous serene hill stations like [Munnar](#) (മുന്നർ), [Ponmudi](#) (പൊംടൂർ) and Waynad. The [Silent Valley National Park](#) in Kerala is among the last tracts of virgin tropical evergreen forest in India.^[17]

- Agasthyamalai Sub-Cluster (with Five Site Elements) including: The [Agasthyamalai Biosphere Reserve](#) 900 km², includes [Kalakkad Mundanthurai Tiger Reserve](#) 806 km², in Tamil Nadu and Neyyar,^[21] Peppara^[22] and Shendurney^[23] Wildlife Sanctuaries and their adjoining areas of Achencoil,^[24] [Thenmala](#), Konni,^[25] [Punalur](#), [Thiruvananthapuram](#) Divisions and Agasthyavanam Special Division in Kerala.^[26]
- Periyar Sub-Cluster (with Six Site Elements) including: [Periyar National Park](#) and nature reserve 777 km², in Kerala, [Ranni](#), [Konni](#) and [Achankovil](#) Forest Divisions. On the eastern side, lying largely in a rain-shadow area with mostly drier forests, lie the [Srivilliputtur Wildlife Sanctuary](#) and reserved forests of the [Tirunelveli](#) Forest Division.

- Chinnar Wildlife Sanctuary, Eravikulam National Park 90 km², Indira Gandhi National Park, Grass Hills National Park and Karian Shola National Park are located within the larger Indira Gandhi Wildlife Sanctuary 958 km², and Palani Hills National Park 736.87 km² (PRO) in Tamil Nadu and Parambikulam Wildlife Sanctuary 285 km² in Kerala.
- Nilgiri Sub-Cluster (with Six Site Elements) including: The Nilgiri Biosphere Reserve with Karimpuzha National Park 230 km² (PRO), Silent Valley National Park 89.52 km² and Wayanad Wildlife Sanctuary 344 km² in Kerala, Bandipur National Park 874 km², Mukurthi National Park 78.46 km², Mudumalai National Park 321 km², New Amarambalam Reserved Forest in Tamil Nadu. This sub-cluster constitutes a largely secure forest complex of over 6,000 km², which is one of the most globally significant conservation areas for highly threatened species such as the Asian elephant, tiger and gaur, besides dozens of endangered species in other taxa.
- Talakaveri Sub-Cluster (with six site elements) including: Brahmagiri Wildlife Sanctuary 181.29 km², Rajiv Gandhi (Nagarhole National Park) 321 km², Pushpagiri Wildlife Sanctuary

- Pushpagiri Wildlife Sanctuary 92.65 km², Talakaveri Wildlife Sanctuary (105.01 km²) in Karnataka and Aralam Reserved Forest in Kerala.
- Kudremukh Sub-Cluster (with Five Site Elements) including: Kudremukh National Park 600.32 km², Someshwara Wildlife Sanctuary and surrounding Reserved Forests of Someshwara, Agumbe and Balahalli in karnataka.
- Sahyadri Sub-Cluster (with Four Site Elements) including: Anshi National Park 340 km², Chandoli National Park 317.67 km², Koyna Wildlife Sanctuary and Radhanagri Wildlife Sanctuary in Maharashtra.

Fauna-

- The Western Ghats are home to thousands of [animal](#) species including at least 325 globally [threatened species](#). Many are [endemic](#) species, especially in the amphibian and reptilian [classes](#).
- **Mammals**- There are at least 139 [mammal](#) species. A [critically endangered](#) mammal of the Western Ghats is the nocturnal [Malabar Large-spotted Civet](#). The arboreal [Lion-tailed Macaque](#) is [endangered](#). Only 2500 of this species are remaining.^[27] The largest population of Lion tailed macaque is in [Silent Valley National Park](#). [Kudremukh National Park](#) also protects a viable population.
- These hill ranges serve as important wildlife corridors, allowing seasonal migration of endangered [Asian Elephants](#). The Nilgiri Bio-sphere is home to the largest population of Asian Elephants and forms an important [Project Elephant](#) and [Project Tiger](#) reserve. [Brahmagiri](#) and [Pushpagiri](#) wildlife sanctuaries are important elephant habitats. [Karnataka](#)'s Ghat areas hold over six thousand elephants (as of 2004) and ten percent of India's critically endangered [tiger](#) population.^[29]
- The largest population of India's Tigers outside the [Sundarbans](#) is in the unbroken forests bordering Karnataka, Tamil Nadu and Kerala. The largest numbers and herds of [vulnerable Gaur](#) are found here with the [Bandipur National Park](#) and Nagarhole together holding over five thousand Gaur.^[30] To the west the forests of [Kodagu](#) hold sizeable populations of the endangered [Nilgiri Langur](#).

- Bhadra Wildlife Sanctuary and project tiger reserve in Chikmagalur has large populations of Indian muntjac. Many Asian Elephant, Gaur, Sambar, vulnerable Sloth Bears, Leopard, tiger and Wild Boars dwell in the forests of Kerala.
- Bannerghatta National Park and Annekal reserve forest is an important elephant corridor connecting the forests of Tamil Nadu with those of Karnataka. Dandeli and Anshi national parks in Uttara Kannada district are home to the Black Panther and normal variety of leopards and significant populations of Great Indian Hornbill. Bhimgad in Belgaum district is a proposed wildlife sanctuary and is home to the endemic critically endangered Wroughton's freetailed bat. the Krishnapur caves close by are one of only three places in the country where the little-known Theobald's tomb bat is found. Large Lesser False Vampire bats are found in the Talevadi caves.^[31]

- **Reptiles**- The snake family [Uropeltidae](#) of the [reptile](#) class is almost entirely restricted to this region.
- **Amphibians**- The [amphibians](#) of the Western Ghats are diverse and unique, with more than 80% of the 179 amphibian species being endemic to the region. Most of the endemic species have their distribution in the rainforests of these mountains.^[32] The endangered [Purple frog](#) was discovered in 2003 to be a [living fossil](#). This species of frog is most closely related to species found in the [Seychelles](#). Four new species of [Anurans](#) belonging to the genus [Rhacophorus](#), [Polypedates](#), [Philautus](#) and [Bufo](#) have been described from the Western Ghats.^[33]
- **Fish**- 102 species of fish are listed for the Western Ghats water bodies.^[8] Western Ghats streams are home to several brilliantly coloured ornamental [fishes](#) like [Red line torpedo barb](#), [Red-tailed barb](#),^[34] [Osteobrama bakeri](#), [Günther's catfish](#) and freshwater [puffer fish](#) [Tetraodon travancoricus](#), [Carinotetraodon imitator](#) and marine forms like [Chelonodon patoca](#) ([Buchanan-Hamilton](#),1822);^[35] [mahseers](#) such as [Malabar mahseer](#)^[36]

- **Insects**- There are roughly 6,000 insect species from Kerala alone.Of 334 butterfly species recorded from the Western Ghats, 316 species have been reported from the Nilgiri Biosphere Reserve.
- **Molluscs**- Seasonal rainfall patterns of the Western Ghats necessitate a period of dormancy for its land snails, resulting in their high abundance and diversity including at least 258 species of gastropods from 57 genera and 24 families.

- **Birds-**

There are at least 508 [bird](#) species. Most of Karnataka's five hundred species of birds [8] are from the Western Ghats region. [\[37\]Bhadra Wildlife Sanctuary](#) is located at the northern end of the Malabar ranges and the southern tip of the Sahyadri ranges and bird species from both ranges can be seen here.

- There are at least 16 species of birds [endemic](#) to the western Ghats including the [endangered Rufous-breasted Laughingthrush](#), the [vulnerable Nilgiri Wood-pigeon](#), [White-bellied Shortwing](#) and [Broad-tailed Grassbird](#), the [near threatened, Grey-breasted Laughingthrush](#), [Black-and-rufous Flycatcher](#), [Nilgiri Flycatcher](#), and [Nilgiri Pipit](#) and the [least concern Malabar Parakeet](#), [Malabar Grey Hornbill](#), [White-bellied Treepie](#), [Grey-headed Bulbul](#), [Rufous Babbler](#), [Wynaad Laughingthrush](#), [White-bellied Blue-flycatchers](#) and the [Crimson-backed Sunbird](#). [38]

Medicinal plants found in western Ghats:



Medicinal plants found in western Ghats:



- Important animal in western Ghats –



Tiger



Elephant



Leopard



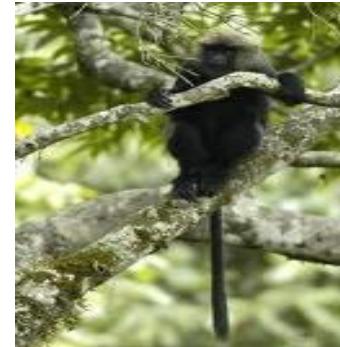
Lion



Bear Gaur



tailed macaque



Nilgiri langur



Nilgiri Thar



Important Birds
sp. in western
Ghats –

400 birds species.



Wayanad Laughing Thrush



Nilgiri Wood Pigeon



Bluewinged Parakeet



Greyheaded Bulbul



malbar grey hornbill



Nilgiri Laughing Thrush



White-necked Stork





Linum usitaissimum



Aristolochia indica



ARECANUT



sandalwood tree



Teak



RUBBER



PEPPER



COFFEE



PATCHOULI



STEVIA



TURMERIC



GINGER



VANILLA