Biodiversity and Its Conservation

Contents

Introduction

Definition- Biological diversity means the variability among living organisms from all sources

Eg. terrestrial, marine and other aquatic ecosystems and the ecological complexes includes diversity within species, between species and of ecosystems

Components of Biodiversity

1. Species biodiversity
2. Genetic Biodiversity
3. Ecosystem Biodiversity

Species Biodiversity

- Species diversity-It is defined as the number and abundance of different species that occupy a location
- In order to accurately check species diversity, both the types and number of species should be measured
- An example of species diversity would be the number and abundance of different types of mammals in a forest
- Flaura- plants, fauna- animals

NATURE FOREVER
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WORLD SPARROW DAY
20th March

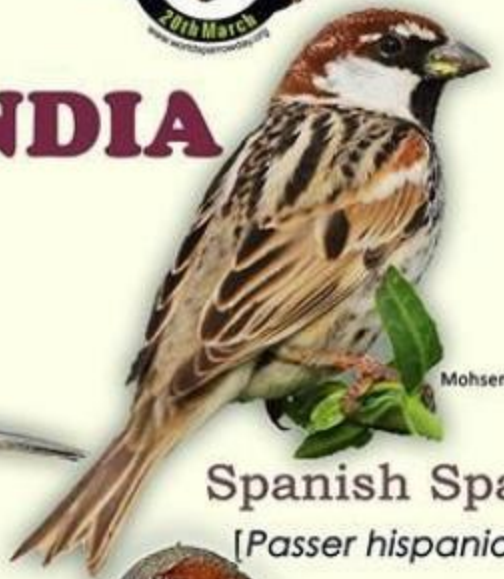
SPARROWS OF INDIA

Laitche - Wikipedia*

Russet Sparrow
[*Passer rutilans*]

S.E.UK*

House Sparrow
[*Passer domesticus*]



Mohsen Vahedipour*

Spanish Sparrow
[*Passer hispaniolensis*]

Alpsdake - Wikipedia*

Eurasian Tree
Sparrow
[*Passer montanus*]

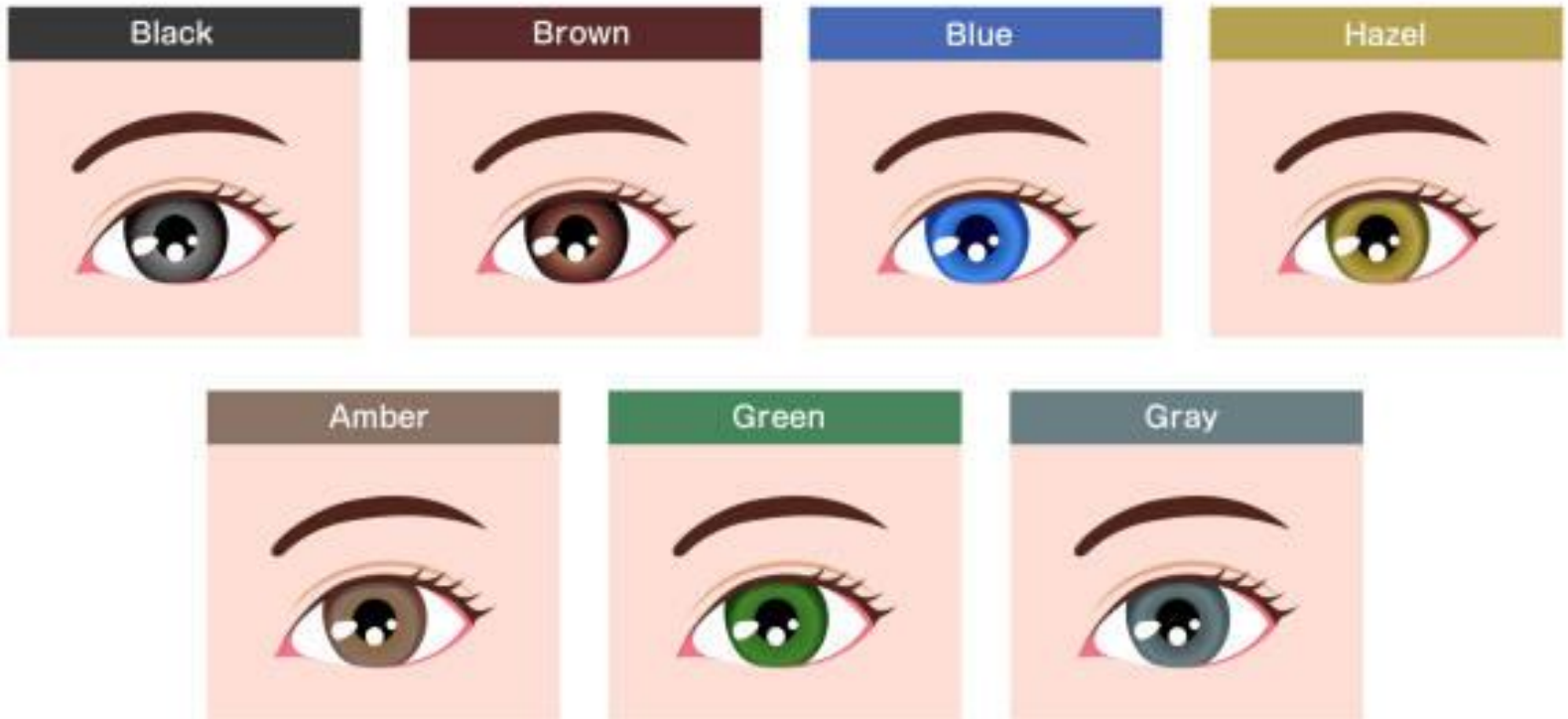
James Eaton*

Sind Sparrow
[*Passer pyrrhonotus*]

Genetic Diversity

- It is the amount of variation in genetic material within a species or within a population
- Eg. Homo sapiens
- There is a high level of diversity among species, but there is an even higher level of diversity among the genetic material of the individuals of a specific species
- An example of genetic diversity is the variation in the genes that differentiate the color of human hair

Eye color types



Ecosystem/ ecological Diversity

- Ecological diversity includes the variation in both terrestrial and aquatic ecosystems
- An example of ecological diversity on a global scale would be the variation in ecosystems, such as deserts, forests, grasslands, wetlands and oceans
- Ecological diversity is the largest scale of biodiversity which include both genetic and species biodiversity

Ursus arctos

Ursus maritimus

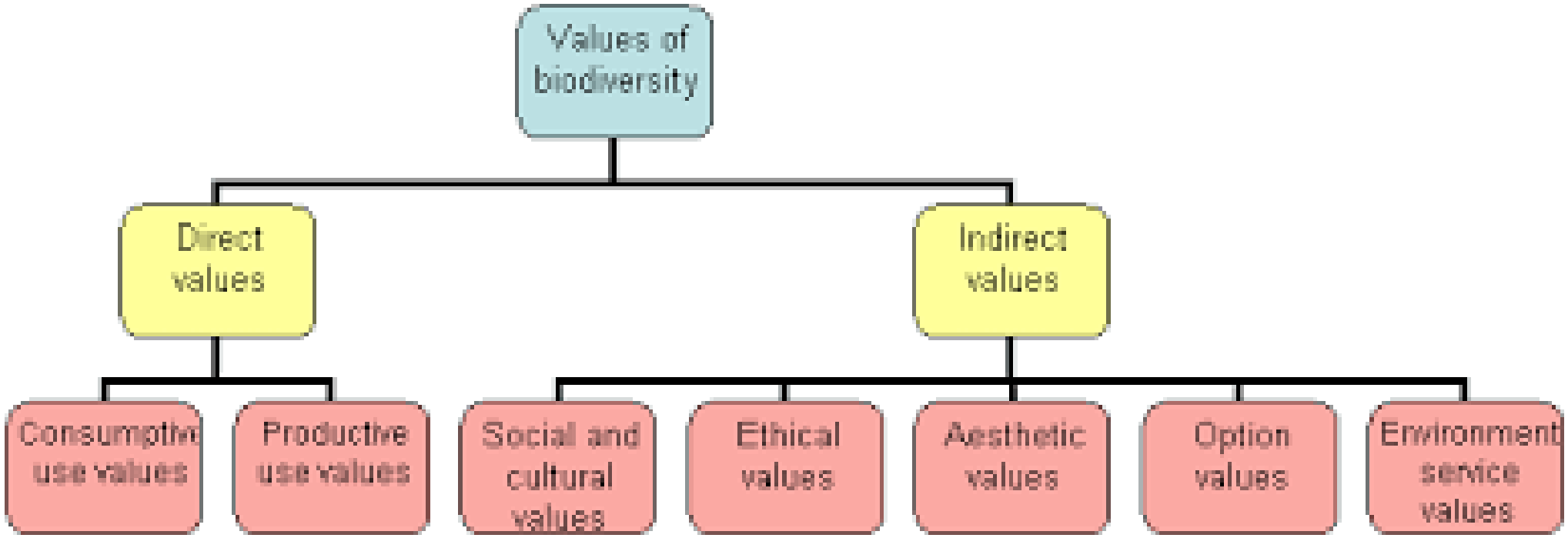
Questions

- What is the significance of genetic diversity?
- How is human activity affecting genetic diversity? -artificial selection, degradation of habitat
- Why prevent loss of genetic diversity?

Biodiversity and Ecosystem Stability

- Ecosystem stability is the ability of an ecosystem to maintain a steady state (equilibrium), even after a stress or disturbance has occurred.
- Biodiversity of an area has a large impact on the ecosystem stability of that area
- Areas with high levels of species and genetic diversity are likely to have a more complex ecosystem, with a variety of food webs and biotic interactions
- This increase in complexity makes it more likely that the ecosystem will return to a stable state after a disturbance, because the ecosystem has more ways to respond to a disturbance and fix problems

Values of Biodiversity



Values of Biodiversity-Direct Values

- Direct dependency on grains, vegetables, fruits which are obtained from plant resources and meat, fish, egg, milk and milk products
- Medicine, fuel, timber, fiber, wool, wax, resin, rubber, silk and decorative items
- 1.Consumptive values-These are the values of biodiversity where products are harvested and consumed directly
- These goods come locally and do not figure in national or international market
- Eg. Food, fuel, drugs etc

Direct Values-Consumptive Values

- Food- Plants- are the basic resources in providing food
- Three crops- wheat, maize and rice, which constitute 2/3 of the food requirement all over the world
- Fuels- forest provide wood which is used as a fuel. Moreover, fossil fuel like coal, petroleum, natural gas are also products of biodiversity which are directly consumed by humans
- Drugs and medicines- the plant biodiversity helps in practicing Ayurveda. In allopathy, the pharmaceutical industry is much dependent on natural products
- Eg.-Quinine(malaria), Penicillin (antibiotic), Vimblastin (anti-cancer)

Direct Values-Productive Values

- These are the direct use of values where the product is commercially sold in national and international markets
- Textile, leather, silk, paper and pulp etc.
- There is a ban on tusks of elephants, wool from sheep, and fur of many animals

Indirect Values

- Biodiversity provides indirect benefit to human beings which support to the existence of biological life and other benefits which are difficult to quantify
- Social Values- tulsi, neem, cow, snake etc are considered sacred. Tiger, peacock, lotus are national birds and animals
- Ethical Values- Each species has an existence values, and all life forms must be preserved (food web)
- Aesthetic Values- Undisturbed nature is a delight to watch and an event for tourism (economy) like sanctuaries, national parks and wild life conservation etc.

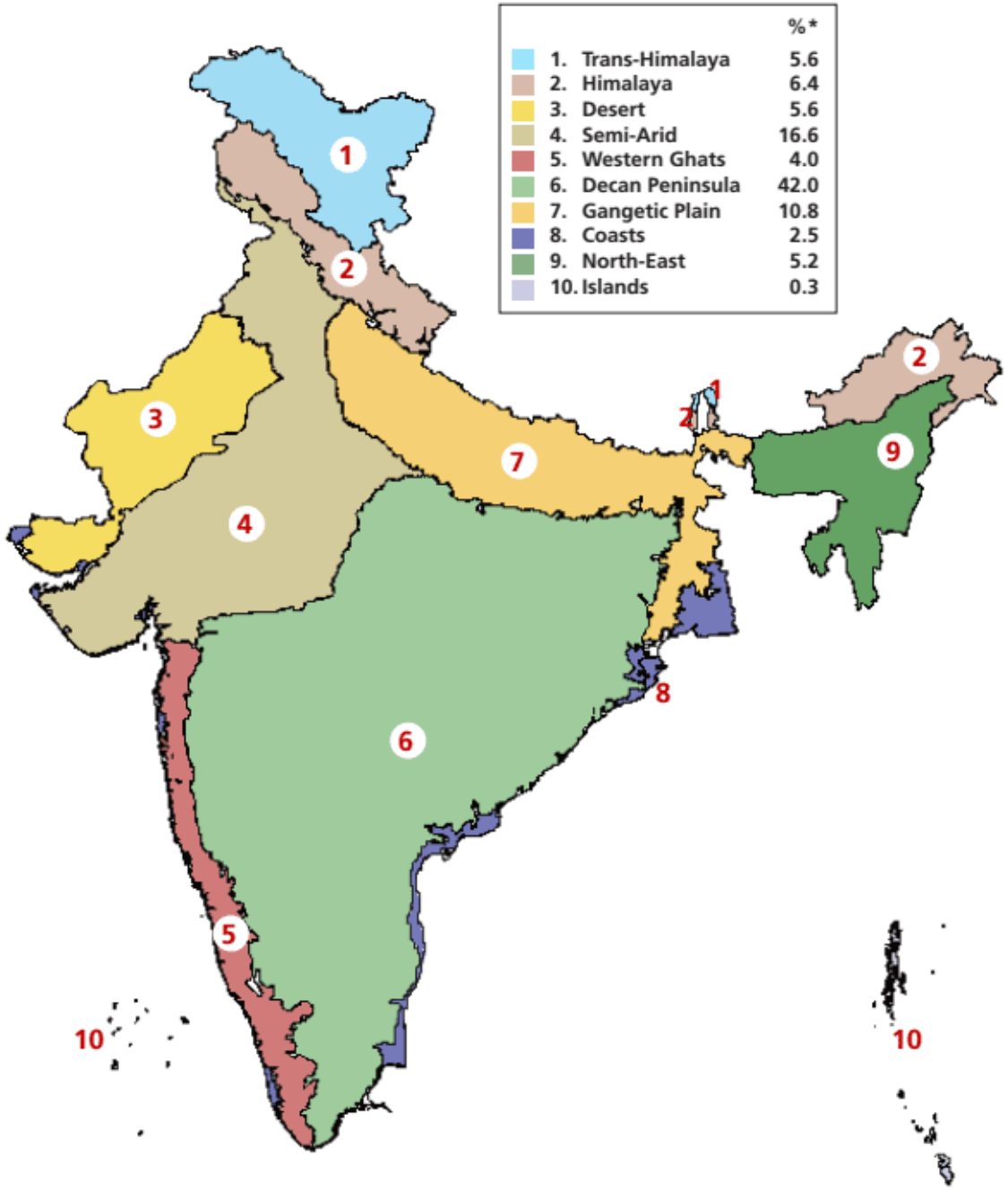
Environmental Services Values

- CO_2 fixation through photosynthesis
- Maintaining of essential nutrients by carbon, nitrogen, Sulphur etc.
- Maintaining water cycles and recharging ground water
- Soil (dead and decaying matter and weathering of rocks etc) formation and protection from erosion
- Regulating climate by recycling moisture into atmosphere
- Detoxification and decomposition of waste

India: as a mega diverse nation

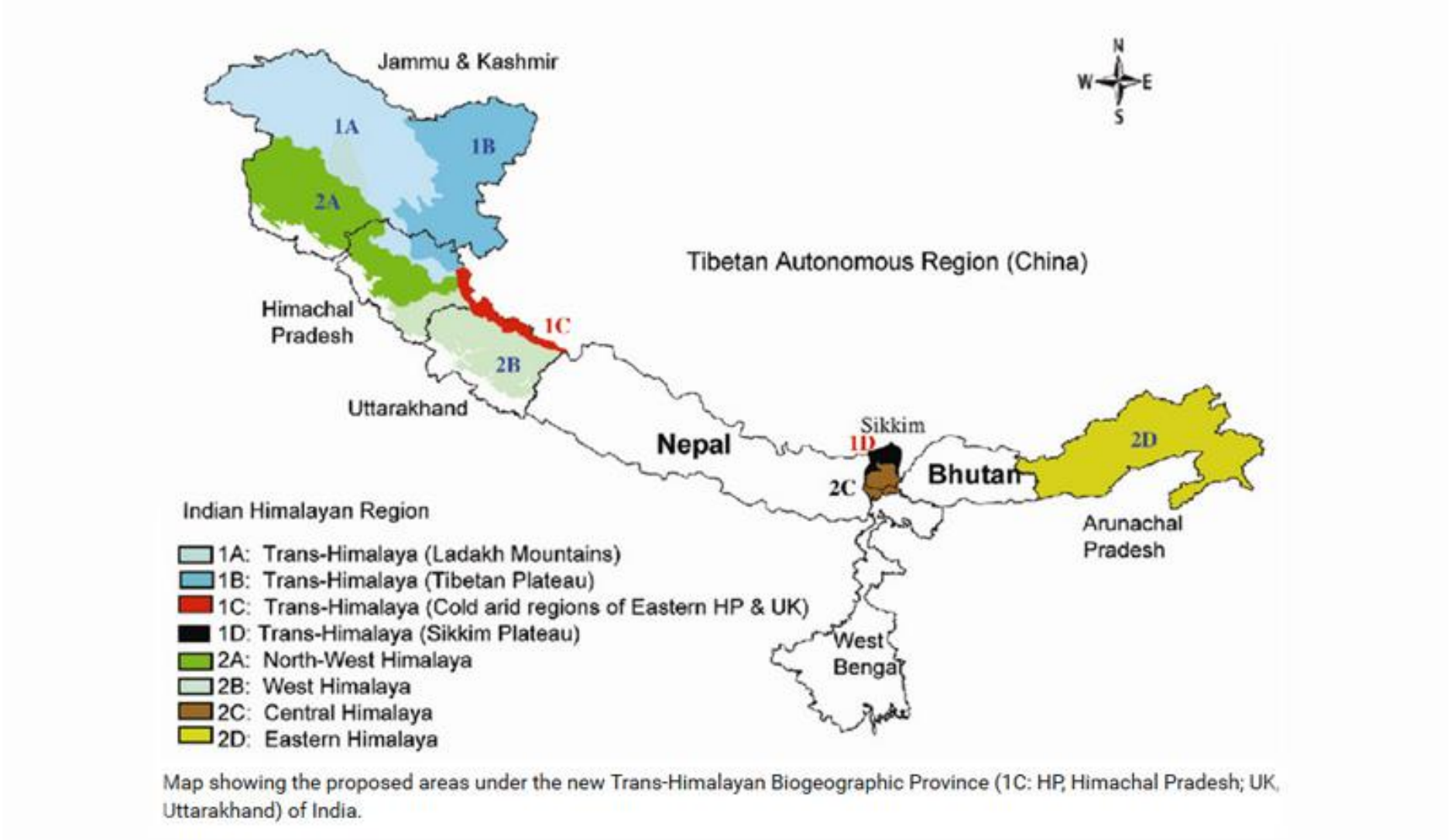
Bio-Geographical zones of India

1. Trans-Himalayan Zone
2. Himalaya Zone
3. Desert Zone
4. Semi-Arid Zone
5. Western Ghat Zone
6. Deccan Plateau Zone
7. Gangetic Plain Zone
8. North-East Zone
9. Coastal Zone
10. Island Zone



Types of Soils

1.Trans-Himalayan Region



Map showing the proposed areas under the new Trans-Himalayan Biogeographic Province (1C: HP, Himachal Pradesh; UK, Uttarakhand) of India.

Trans-Himalayan zone

Features

- Area is very cold and arid (4500-6000 mts) above sea level
- Vegetation is sparse alpine steppe (high altitude grassland)
- Largely Bare rocks and glaciers
- Animals- Wild sheep, and goats, snow leopard, marbled cat, marmots
- Region- 1600 Km long range Jammu & Kashmir, Arunanchal Pradesh
- Mountain ranges- Karakoram and Kailas Range

Marco polo sheep - ratio of horn length to body weight exceeds that of any animal in the world

2.Himalayan Zone

- Youngest, loftiest mountain chains in the world
- High altitude, steep gradient, and rich flora and fauna
- Plants- Oak, Chest nut, Conifer, ash, pine and deodar
- Animals-Mountain goats, shrew, tapir. Panda and snow leopard
- Spread in 5 countries- Bhutan, China, India, Nepal, Pakistan
- Forest- Tropical rain forest, Alpine forests

Topography of Himalayas

- Series of mountains running parallel to each other
- Thick gravel and alluvium soil
- Source of major snow fed rivers of India
- Snow covered peaks, glaciers and pristine rivers

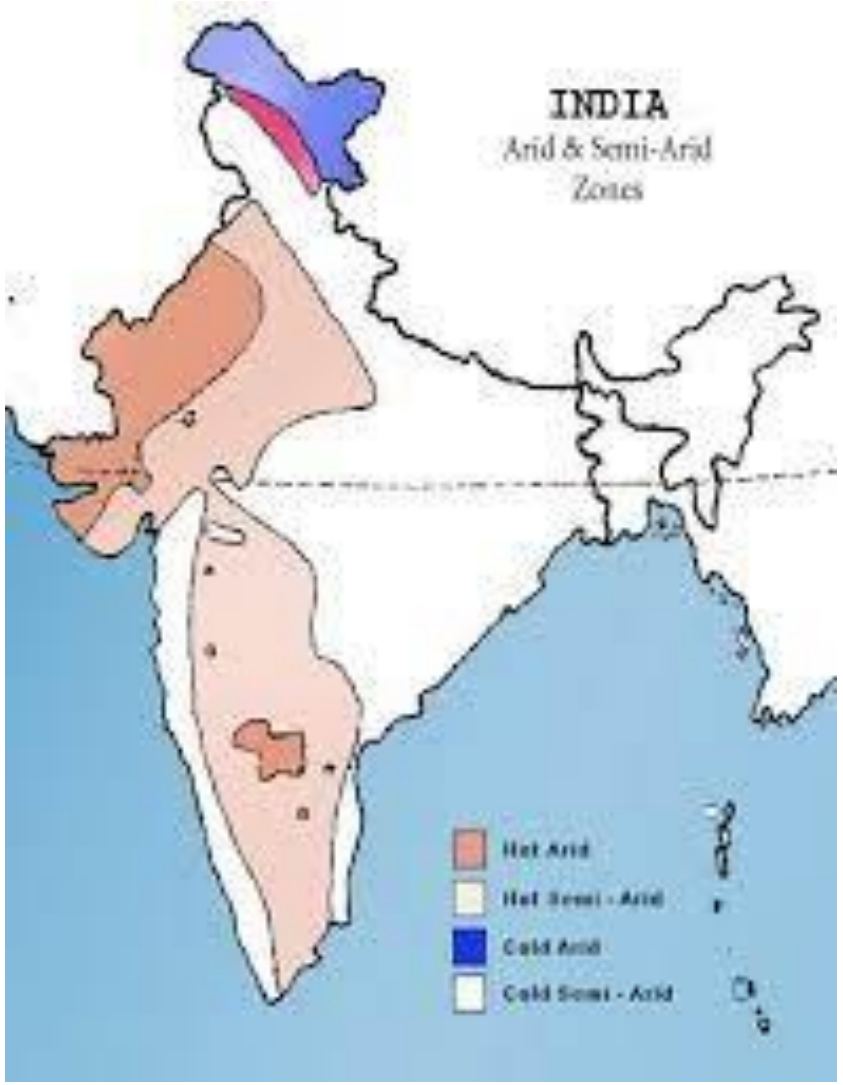
3. Desert

- Deserts in India include Thar desert and Kutch
- They receive around 2.5 cm of precipitation annually
- Temperature- 30 to 50 degree Celsius
- Plants- cactus, prickly pear, kikar, octillo plant
- Animals- Snakes, owls, mice, foxes, bats, vultures, camel etc.
- Soil- sand and hard rocks

4. Semi-arid Region

- Transition zone between desert and dense forest of Western Ghats
- States- Parts of Punjab, Haryana, Gujarat, Maharashtra
- Natural vegetation is thorn forest
- Open areas of base and water deficit soil
- Plants- Thorny shrubs, grasses, cereals,
- Animals- Birds, jackals, eagles, snakes, foxes, lions, wolves, deer etc.

4. Arid- Semi Arid zones of India



5. Western Ghats

- Covers Malabar Plains and Western Ghats
- States- Tamil Nadu, Maharashtra, Karnataka, Parts of Kerala
- Mountains along the west coast of India
- Average Altitude :900-1500 mts above sea level
- Plants- rich evergreen forests, medicinal plants, ornamental Plants
- Animals- 325 globally threatened species, 16 species of endemic mammals, 508 species of birds, 6000 species of insects, 344 species of butterflies
- Tribal Population is found in this region

5. Western Ghats

6.Deccan Plateau

- Semi arid regions lying in the rain shadow region of western Ghats
- Central and Eastern Highlands provide many forest products
- Composed of oldest crystalline rocks
- It is semi arid in the north and tropical in most parts
- Rain fall in the monsoon and temperature can exceed up to 40 degrees in summer
- Types of forests: deciduous, thorn and scrublands
- Soil- Black soil, suitable for cotton crop
- Plants- consists mainly of dry deciduous forests
- Animals- grazing animals, rhinoceros, wild water buffalo, bear, wild dog

7.Gangetic Plain

- Its covered with deciduous forests, with high population density
- The area is primarily covered with agriculture
- Plants- Teak, sal, shisham, mahua, khair etc.
- Animals- Tiger, one horned rhinoceros, Asian elephant, gaur, swamp deer, crocodile and other large mammals
- Rainfall- 25-35 cm annually

7.Gangetic Plain

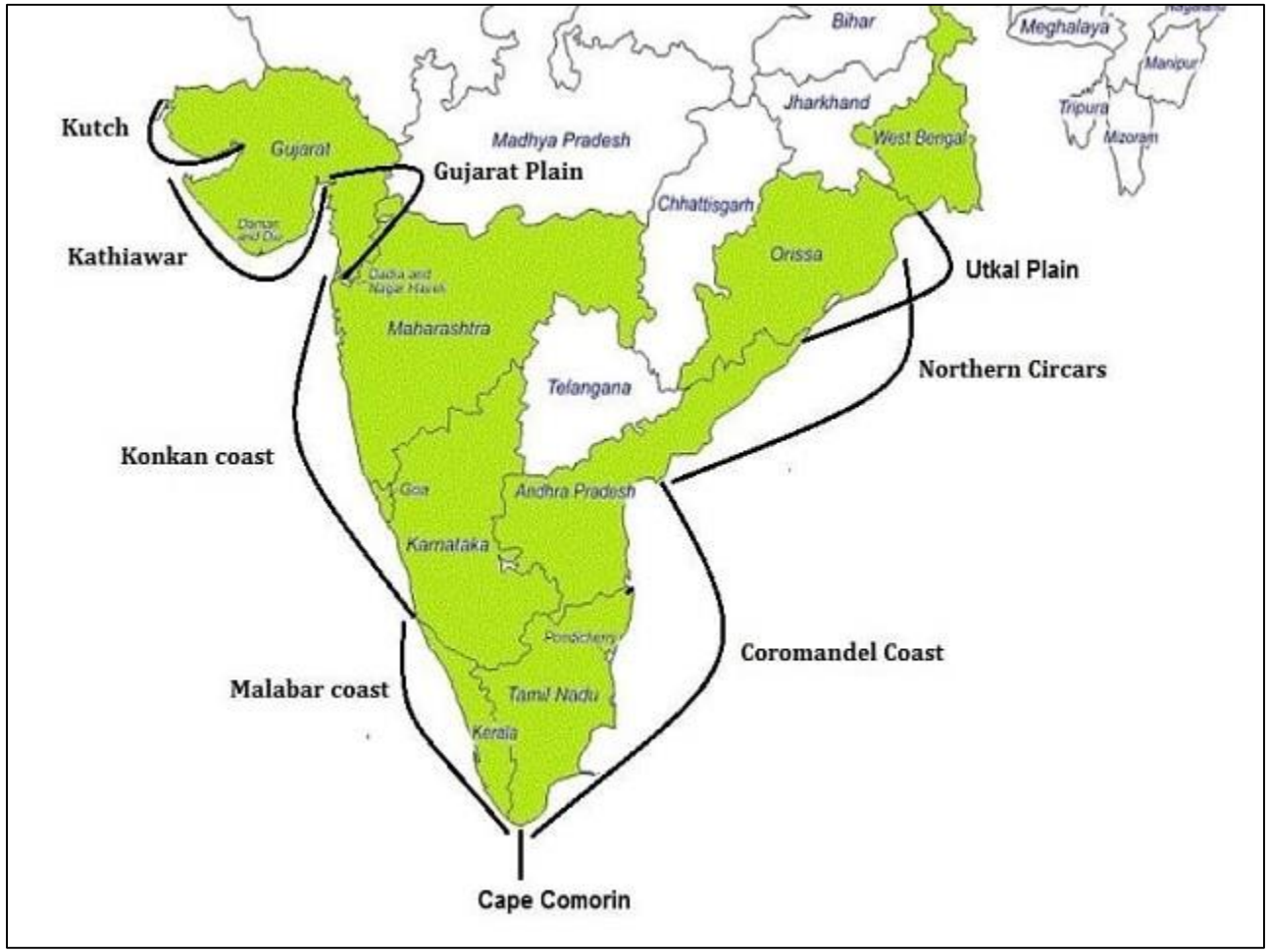
8.Coastal Zone

- Includes west coast, east coast and Lakshadweep.
- India has coastline extending 5500 kms.
- Best preserved evergreen forests are found here, especially, in Lakshadweep.
- Mangrove forests – a prominent feature.
- Coral reefs are found in Lakshadweep.
- Fertile land is found here. Most suitable for rice and coconut trees.
- Flora: railroads vines, coconut trees, beach grass etc.
- Fauna: large variety of birds, insects and marine animals. Seagulls, pelican, penguin, terns, crabs, sea turtles, seals etc.
- States covered: Kerala, Tamil nadu, Karnataka, Andhra Pradesh, Gujarat, goa, Maharashtra, Orissa, west Bengal.

8.Coastal Zone

- Includes the west coast, east coast and Lakshadweep
- India has a coastline extending 5500 Kms
- Best preserved evergreen forests and coral reefs are found here, especially in Lakshadweep
- The soil is suitable for rice and coconut trees
- Plants: coconut trees, railroad vines, beach grass etc.
- Animals: Large variety of birds, insects and marine animals. Seagulls, pelican, penguin, terns, crabs, sea turtles etc.
- States: Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Gujarat, Goa, Maharashtra, Orissa, West Bengal

8.Coastal Zones



9.North East India

- One of the richest areas of India in terms of biodiversity.
- Several species of orchids, bamboos, ferns, mango, bananas, citrus fruits, pepper, medicinal plants etc.
- States included: Assam, Arrunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura.
- One of the biodiversity hotspots of the world.
- Fauna: rich in rare species, red panda, slow Loris, marbled cat, leopard cat, bats and rodents, sangai, wild elephant, blue sheep, yak, lots of

9.North East India

- Rich in biodiversity
- Common plants – orchids, bamboos, ferns, mango, banana, citrus fruits, pepper, medicinal plants etc.
- States- Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
- One of the bio diversity Hotspot of the world
- Animal- rich in rare species, red panda, slow loris, marbled cat, leopard cat, bats and rodents, sangai, wild elephant, blue sheep, yak, lots of species of birds, python and other lower vertebrates, amphibians, butterflies etc.

North East Zone

Mixed formations
Evergreen
Sub-tropical broadleaved
Sub-tropical dry evergreen
Montane wet temperate
Himalayan moist temperate
Sub alpine
Semi-evergreen
Moist deciduous
Sal mixed moist deciduous
Teak mixed moist deciduous
Bamboo mixed
Temperate coniferous
Gregarious formations
Sal
Teak
Dipterocarpus/Mesua
Bamboo
Pine
Fir
Local Specific formations
Fresh water swamp forest
Riverine
Sacred groves
Forest Plantations
Cryptomeria
Degradational formations
Degraded forest
Shifting cultivation
Abandoned jhum
Scrub/ Scrub land
Scrub
Moist alpine scrub
Grasslands
Grassland
Swampy grassland
Cultivated/Managed
Orchard
Tea
Others
Agriculture
Water body
Wet lands
Settlement
Barren land
Snow

10.Islands

- over 600 species of marine fishes, 78 species of corals, 82 species of seaweed, 52 species of crabs, 2 species of lobsters, 48 species of gastropods, 12 species of bivalves, 101 species of birds.
- Sparsely populated, tribal population.
- Huge variety of marine species.

10. Islands

- Tropical Climate and largely humid weather
- Maximum temperature- 28 degree Celsius
- Plants- Gain evergreen, forests, wet bamboo, brakes, semi-evergreen forests, mangrove forests, sub montane forests
- Animals- 50 varieties of forest mammals, wild boar, crocodile, sea cow, leopard, butterflies and moths, shellfish
- Sparsely populated, tribal population
- Huge variety of marine species

Hotspots of Bio-Diversity

- To qualify as a biodiversity hotspot, an area must meet two strict criteria:
  - Contain at least 1,500 species of vascular plants found nowhere else on Earth (known as "endemic" species).
  - Have lost at least 70 percent of its primary native vegetation
- Eastern Ghats
- Western Ghats