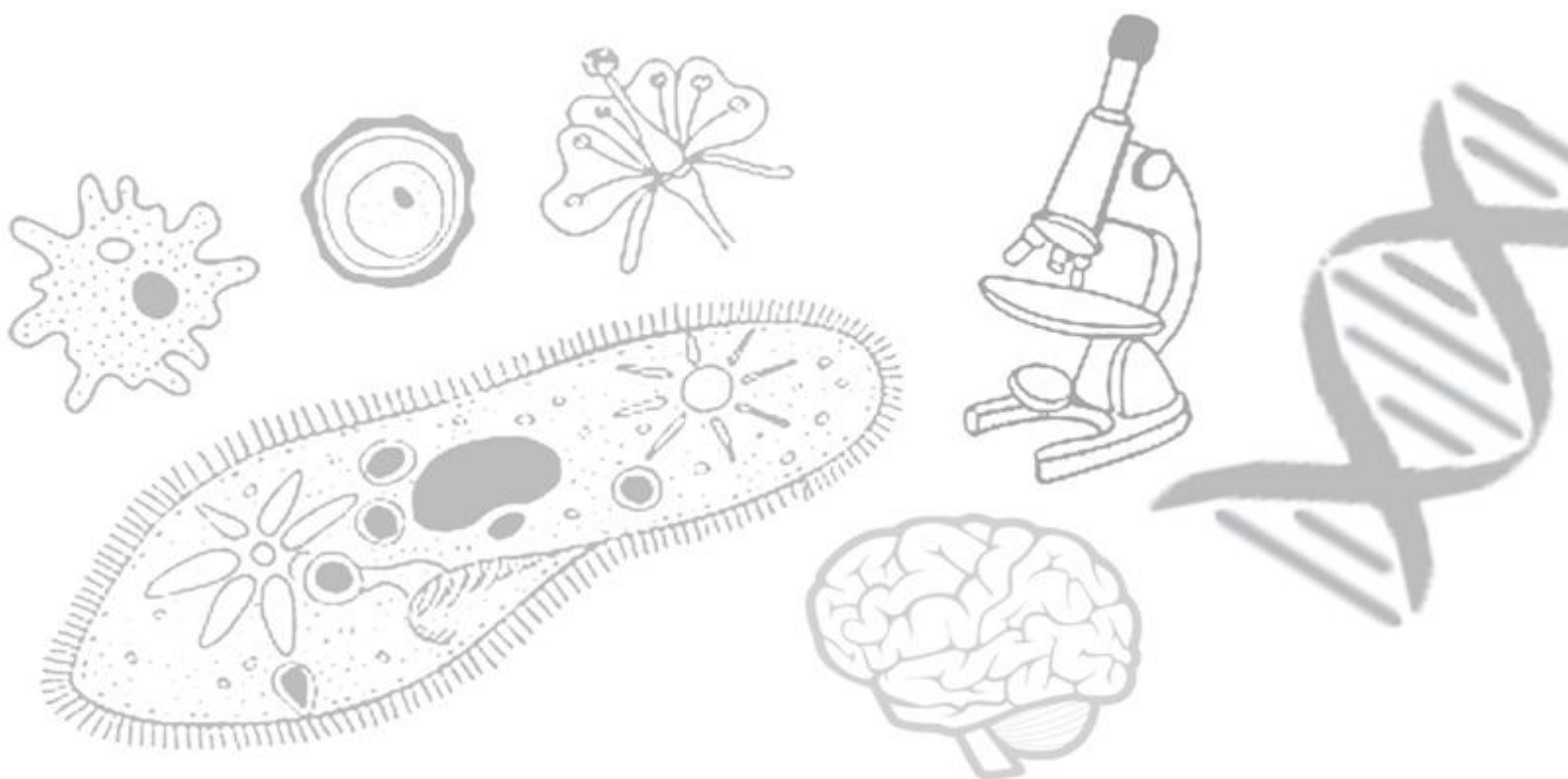


SCIENCE



Deforestation and its Causes

Biodiversity

- The variety in living organisms existing on the Earth is called biodiversity.
- The term biodiversity was coined by Walter G. Rosen in 1896.
- India is one of the 12 mega biodiversity countries in the world. It has a rich and diverse biodiversity with several habitats, ranging from tropical rainforests to deserts.



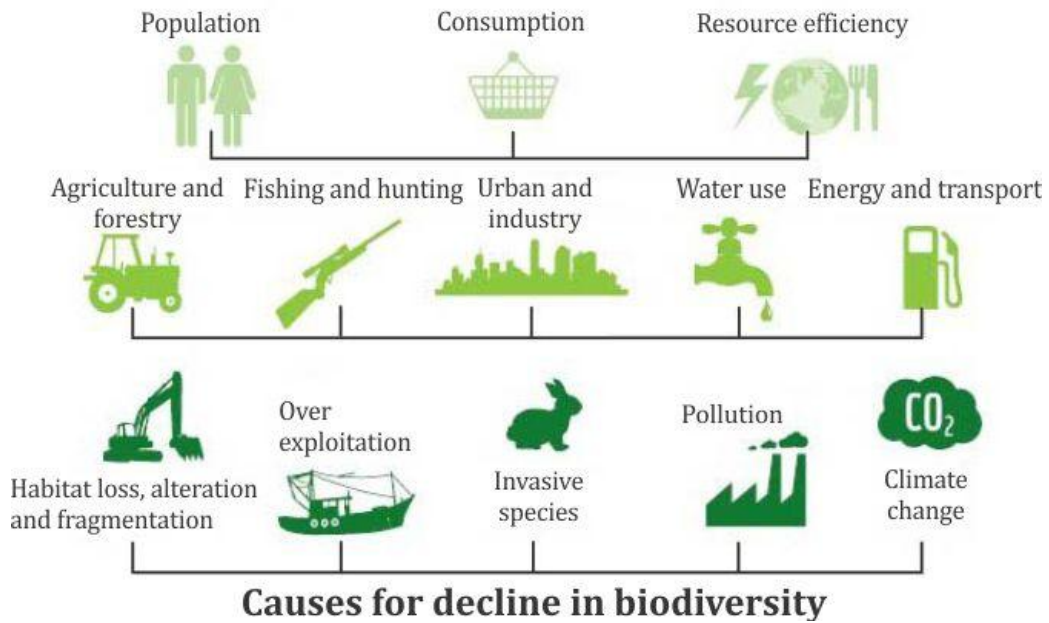
Biodiversity

Importance of Biodiversity

- Biodiversity is important for the survival of all living beings.
- Every living organism depends on other organisms for its basic necessity of food.
- All living creatures are supported by the interactions among organisms and their immediate environment.
- A biologically diverse natural environment provides human beings with their necessities of life and forms the basis of the economy.
- It is very important to conserve the vast biodiversity which exists on this planet not only because it provides services to humans but also because it helps us in many ways such as pollination, nutrient cycling and regulation of the atmosphere and climate.

Causes for decline in Biodiversity

- Increasing human population
- Overexploitation of plant and animal species
- Deforestation
- Environmental pollution
- Global warming

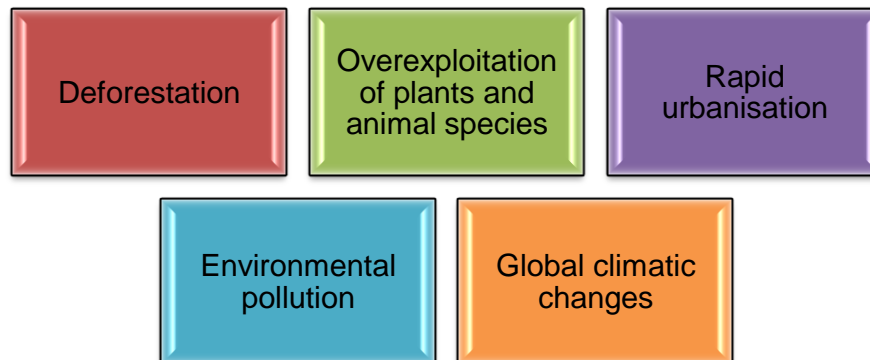


An ecosystem is a self-contained area composed of different kinds of organisms living in it, interacting with each other as well as with physical conditions such as sunlight, air, water, soil and climatic factors prevailing in the area.

DID YOU KNOW ?

The biosphere is that part of the Earth in which living organisms exist.

Threats to Biodiversity





Deforestation

Deforestation The indiscriminate cutting down of trees or destroying forests to use land for some other purpose is called deforestation.	
<p style="text-align: center;">Causes of deforestation</p> <ul style="list-style-type: none"> • For urban and construction purposes • To obtain fuel • To grow crops • To create grazing land • Forest fires • Droughts • Volcanic eruptions 	<p style="text-align: center;">Consequences of deforestation</p> <ul style="list-style-type: none"> • Soil erosion • Alteration of local and global climate • Frequent flooding • Shortage of wood and other forest products • Affects water cycle • Extinction of wild plants and animals

A species is an organism of a particular kind whose members can interbreed among themselves to produce fertile young ones. Members of a species have common characteristics. All human beings belong to the same species *Homo sapiens*.

Overexploitation of Plant and Animal Species

- Numerous forests, fisheries and wildlife resources are overexploited because of their economic value.
- Overexploitation leads to a reduction in the number of certain species of plants and animals while others become rare or endangered and sometimes even extinct.

SPECIES	DESCRIPTION
Rare species	<ul style="list-style-type: none"> • Rare species exist in relatively low numbers but are not necessarily in immediate danger of extinction. • Examples: Black and white ruffed lemur, <i>Aloe polyphylla</i>
 <p style="text-align: center; margin-top: 5px;"><i>Aloe polyphylla</i></p>	 <p style="text-align: center; margin-top: 5px;">Black and white ruffed lemur</p>

Endangered species

- An endangered species is one in which the population of organisms is at the risk of becoming extinct.
- Examples: The Indian rhinoceros, the Great Indian bustard, Pink Butterfly Orchid



Great Indian bustard



Pink Butterfly Orchid

Vulnerable species

- Species which exist in low numbers and may become endangered due to destruction of habitat, overexploitation or due to some other environmental factors are called vulnerable species.
- Examples: The Asian elephant, Rafflesia



The Asian elephant



Rafflesia

Threatened species

- Threatened species are any species which are vulnerable to endangerment in the near future.
- Examples: Giant Panda, Monarch butterfly



Giant Panda



Monarch butterfly

Endemic species

- Plant and animal species which are found only in a particular region and nowhere else in the world are called endemic species.
- Examples: Nilgiri leaf monkeys found in the Nilgiri Hills of the Western Ghats; Asiatic lions of Gir National Park, Gujarat; Bengal tiger found in Sundarbans National Park, West Bengal



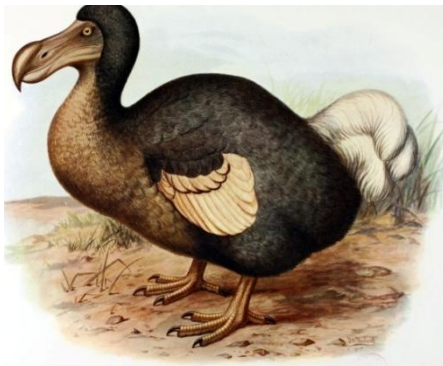
Asiatic lion



Bengal tiger

Extinct species

- A species is considered extinct when no member of the species is still alive.
- Examples: Dodo, Woolly Mammoth



Dodo



Woolly Mammoth

Rapid Urbanisation

- With the ever-burgeoning population, the demand for housing has increased multifold. This has resulted in clearing of forest areas and reclamation of land from the sea.
- The forest wealth and the mangroves are diminishing day by day. This has a cascading effect on various factors such as climatic conditions, reduction in rainfall and occurrence of floods.
- Many construction activities are undertaken for the development of infrastructure in our country. Construction of roads, dams and factories has resulted in felling of trees and destruction of habitats rich in biodiversity.



Clearing of forests due to urbanisation

Environmental Pollution

- Environmental pollution or pollution of air, land and water strains the ecosystems and may reduce or eliminate population of sensitive species.
- Mangrove vegetation and associated biodiversity are often destroyed due to oil pollution.
- Soil microbes also suffer from pollution as industrial effluents with heavy metals result in salinisation.
- Acid rain due to air pollution has also damaged forests.



Effect of acid rain on forests



Effect of oil pollution

Change in Global Climate

- Global climate change can be described as a potential cause of biodiversity loss. Many human actions such as burning of fossil fuels, installation of power plants, burning of petrol and diesel in the engines of vehicles lead to emission of many harmful gases into the atmosphere. Due to this, there has been a steady rise in the temperature of the Earth.



Burning of fossil fuels



Installation of power plants



Burning of petrol in the engines of vehicles

Conservation of Biodiversity



Conservation of Forests

- Forests are cleared for agriculture, forestry, housing and other developmental activities such as construction of roads and building of hydro-electric plants.
- Protection of forest cover is the need of the hour.

Ways to Protect Forests



Forest management

- It is the effective management of forests to judiciously use its produce such as fodder, fibres, timber, medicines, gum and resins.
- It involves conservation of forests by planting trees which are cut regularly.
- It also ensures continued production of its goods such as timber, fuel and wood.



Preventing overgrazing of animals

- Grazing animals eat young trees and destroy their leaves and branches. They may also injure the roots and trunk of trees.
- It is essential to prevent overgrazing in order to protect forests.



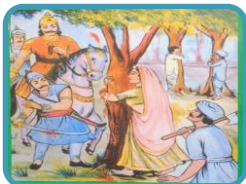
Preventing forest fire

- One of the most convenient ways is to construct fire lines in the forest. Fire lines constructed at regular intervals provide a gap at which a fire can be stopped.
- Practices such as safe campfire and safe fireworks should be adopted near the forest area.



Social forestry

- Trees are planted at all available public lands.
- Fast-growing trees planted on the boundaries of fields, along roadsides, railway tracks and canals help to obtain firewood, fodder, timber and fruits.



Public participation

- The Chipko Movement is an excellent example of public participation in forest conservation programmes.
- The Chipko Movement was started in 1970 by tribal women in the Himalayas. It was aimed at the protection and conservation of trees from woodcutters by embracing them.



Afforestation

- Afforestation is the planting of trees on non-forest land.
- Large-scale afforestation helps in soil conservation, checks atmospheric carbon dioxide levels and prevents floods.

FOREST (CONSERVATION) ACT, 1980

A COMMITMENT OF THE CENTRAL GOVERNMENT FOR THE CAUSE OF ENVIRONMENTAL CONSERVATION AND SUSTAINABLE DEVELOPMENT

Forest conservation laws

- The Forest Conservation Act 1980 emphasises on preventing deforestation and regulating the use of forest land for non-forest purposes such as cultivation of tea, coffee, rubber and spices.
- The act was amended in 1988 with strict provisions against the violators.



Recycling of paper

- Paper recycling is the process of remaking new paper products from waste paper.
- Besides recycling, used sheets of paper can be used to make useful things such as paper bags, writing paper, greeting cards and wrapping paper.
- Recycling of paper helps to conserve energy as it uses 25% less energy than the energy used in making paper from trees.
- Recycling of paper helps to save water, oil and fuel used in making paper.

**DID YOU
KNOW**

It takes almost 17 full grown trees to make one tonne of paper. Hence, recycling of paper is a useful exercise to preserve our forests.

Reforestation

- Reforestation is restocking of destroyed forests by planting new trees.
- It takes place on land where trees are recently removed either due to harvesting or due to a natural disaster such as a fire, flood or volcanic eruption.



Reforestation

- Reforestation can occur naturally or through human efforts.
- If a deforested area is left undisturbed, then it can re-establish and mature itself naturally. However, planting of trees can reduce the length of the time required for a forest to mature.

Conservation of Wildlife

- Preservation of forests and wildlife is a big challenge placed before us.
- Many wild species have either become extinct or are endangered.
- It is therefore essential to conserve the rich wildlife and protect it from getting extinct.

Ways to Conserve Wildlife

Conserving habitat

- Conservation of habitat refers to taking care of the habitat of wild animals so that they feel safe and secure.
- Different types of habitats are studied and regular statistical surveys of animal populations in that habitat are carried out in order to acquire information about the change in population.
- This enables us to identify the species whose population shows a decline and take immediate action to protect them.

Creating habitat

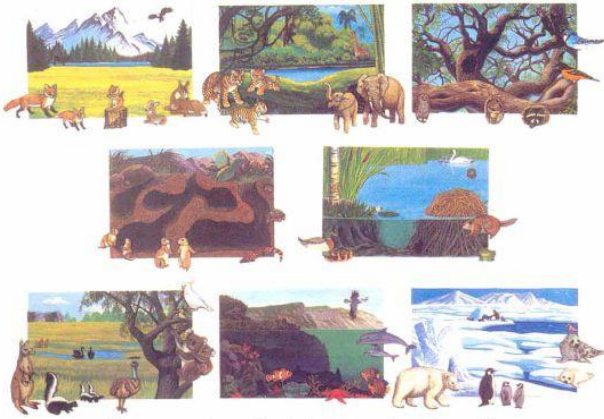
- Protection of endangered species by creating protected areas such as national parks, sanctuaries and biosphere reserves.
- Launching of successful captivity breeding programmes for endangered and other important wildlife species.

Protection by law

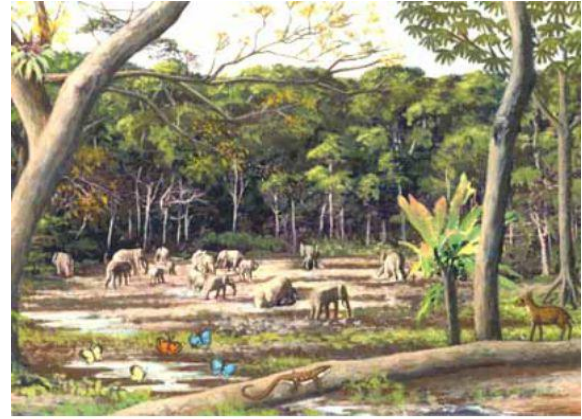
- The Indian Government has implemented strict laws to protect wildlife.
- According to the Wildlife Protection Act 1972, poaching or killing of animals is punishable under law.
- Hunting of endangered animals is banned.
- Project Tiger was launched by the Indian Government in 1973. The main motive of this project was to protect the tigers by providing them a safe place to flourish. Hence, special tiger reserves such as the Satpura Tiger Reserve and Sariska Tiger Reserve were constructed throughout the country.

Organisations involved in wildlife conservation

- The International Union for Conservation of Nature (IUCN) provides information about endangered plant and animal species.
- In India, the Indian Board for Wildlife plays an important role in monitoring the endangered species.
- The World Wide Fund for Nature (WWF) also plays an active role in the conservation of natural resources.



Conserving habitats of animals

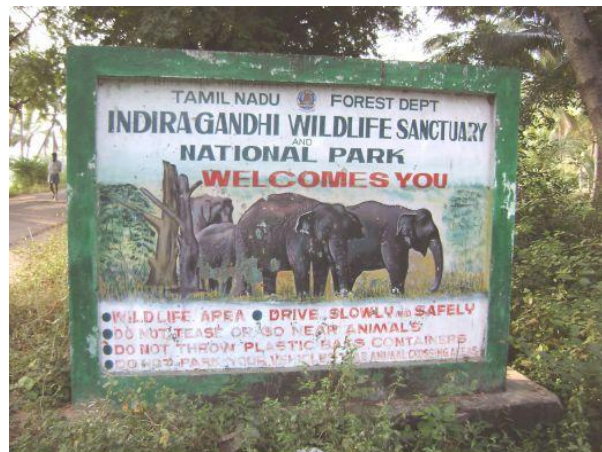


Creating habitat for endangered species



Wildlife Sanctuary

- A wildlife sanctuary is an area where animals are protected from any kind of disturbance such as hunting, predation and competition. It is a protected area created by the government. The government lays down rules, methods and policies to protect and conserve the animals.



Wildlife sanctuary

- Wildlife sanctuaries are mainly established to protect endangered species. They may also be established for preserving biodiversity.
- Threatened wild animals such as black buck, white eyed buck, golden cats, marsh crocodiles, python and rhinoceros are protected in the wildlife sanctuaries of India.

SANCTUARY	STATE
Sanjay Gandhi Wildlife Sanctuary	Maharashtra
Mudumalai Wildlife Sanctuary	Tamil Nadu
Nagarjunsagar Wildlife Sanctuary	Andhra Pradesh
Bharatpur Bird Sanctuary	Rajasthan
Sultanpur Lake Sanctuary	Haryana
Dandeli Wildlife Sanctuary	Karnataka
Thattekad Bird Sanctuary	Kerala
Satkosia Basipalli Wildlife Sanctuary	West Bengal
Lockchao Wildlife Sanctuary	Manipur
Bori Wildlife Sanctuary	Madhya Pradesh

- A zoo is a place where animals are kept imprisoned within an artificially created habitat.



Zoo

Differences between Wildlife Sanctuary and Zoo

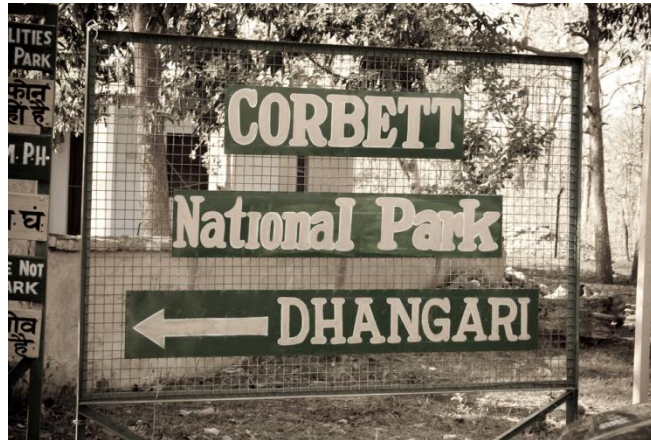
WILDLIFE SANCTUARY	ZOO
1. The wild animals and birds live in their natural habitat in the forest.	1. The wild animals and birds live in artificial habitats such as cages and enclosures.
2. It contains wild animals and birds found locally.	2. It contains wild animals and birds brought from different parts of the country and from other countries.
3. It is not open to public freely. They can only visit when accompanied by a forest guard.	3. It is open to public for a fixed time every day.
4. Wild animals and birds are very comfortable in the natural environment of a wildlife sanctuary.	4. Wild animals and birds are not comfortable in the artificial environment of a zoo.

DID YOU
KNOW ?

There are almost 441 wildlife sanctuaries in India.

National Parks

- National parks comprise a large area of land owned by the government which is restricted from development and is protected for its landscape, flora, fauna and ecosystem on the whole.



National park

- Some national parks are home to a particular animal species. Examples: Gir National Park in Gujarat for Asiatic lions, Kaziranga National Park for rhinoceros, Kanha National Park for tiger etc.

NATIONAL PARK	STATE
Corbett National Park	Uttarakhand
Kanha National Park	Madhya Pradesh
Ranthambore National Park	Rajasthan
Gir National Park	Gujarat
Kaziranga National Park	Assam
Sunderbans National Park	West Bengal
Bandipur National Park	Karnataka
Dachigam National Park	Jammu and Kashmir
Sariska National Park	Rajasthan
Satpura National Park	Madhya Pradesh

Advantages of National Parks

Preserve wildlife as well as the important environmental heritage of a nation.

Provide evidence of a prehistoric human life in the jungles.

Rock paintings found in these shelters give us an idea about the life of primitive man.

Provide human recreation and enjoyment.

Protect whole sets of ecosystems.

DID YOU KNOW ?

There are almost 96 national parks in India.

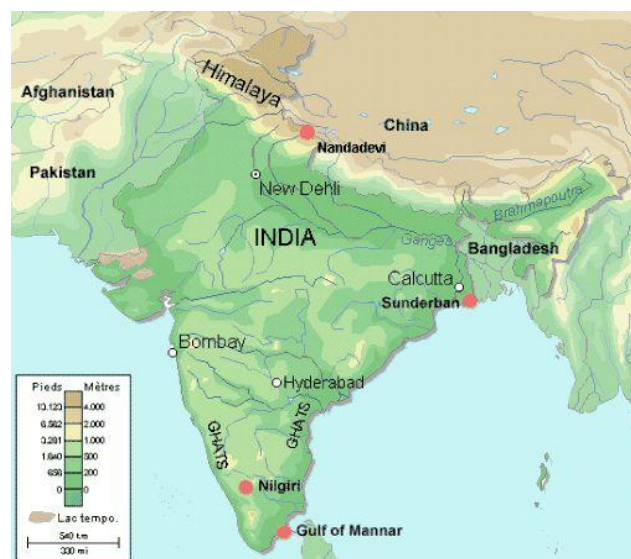
Migration

The movement of animals in large numbers from one place to another to overcome unfavourable conditions is called migration.

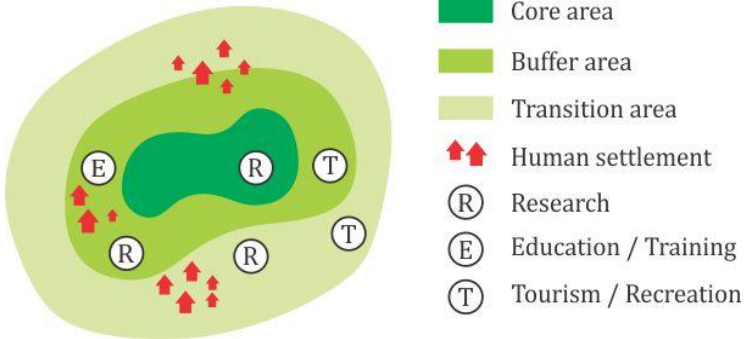
Birds such as Siberian cranes migrate to Bharatpur in Rajasthan because the environmental conditions there are more favourable as compared to Siberia, the place where they actually come from. The Siberian cranes mostly feed on insects. They need food in sufficient quantity to feed themselves and their young ones. Also, warmth is necessary for incubation of eggs. In Siberia, due to cold conditions, food is not available in adequate quantities. Hence, these birds migrate to Bharatpur where there is sufficient sunlight and warmth and the conditions are suitable for their breeding.

Biosphere Reserves

Biosphere reserves or biodiversity zones are large areas of protected land for the conservation of wildlife, plant and animal resources and the traditional life of tribal people living in the area.



Biosphere reserves

<p>Basic design of a biosphere reserve</p>	<ul style="list-style-type: none"> A biosphere reserve is divided into three zones—core zone, buffer zone and transition zone.  <p style="text-align: center;">Structure of a biosphere reserve</p> <ul style="list-style-type: none"> Core zone: It is the innermost zone of a biosphere reserve. It is devoted to strict protection of wildlife. No human activity is allowed in this zone. Buffer zone: It is the middle zone of a biosphere reserve surrounding the core zone. Only limited human activity is allowed in this zone. Transition zone: It is the outermost zone of a biosphere reserve. Several non-destructive human activities which are necessary to sustain life are allowed in this zone. 												
<p>Biosphere reserves in India</p>	<table border="1"> <thead> <tr> <th>Biosphere Reserve</th> <th>State</th> </tr> </thead> <tbody> <tr> <td>Great Nicobar Biosphere Reserve</td> <td>Andaman and Nicobar</td> </tr> <tr> <td>Kaziranga Biosphere Reserve</td> <td>Assam</td> </tr> <tr> <td>Kanha Biosphere Reserve</td> <td>Madhya Pradesh</td> </tr> <tr> <td>Sunderbans Biosphere Reserve</td> <td>West Bengal</td> </tr> <tr> <td>Pachmarhi Biosphere Reserve</td> <td>Madhya Pradesh</td> </tr> </tbody> </table>	Biosphere Reserve	State	Great Nicobar Biosphere Reserve	Andaman and Nicobar	Kaziranga Biosphere Reserve	Assam	Kanha Biosphere Reserve	Madhya Pradesh	Sunderbans Biosphere Reserve	West Bengal	Pachmarhi Biosphere Reserve	Madhya Pradesh
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<p>Role of biosphere reserves</p>	<ul style="list-style-type: none"> Help in conservation of wildlife of the area Help to maintain the biodiversity of the area Preserve the natural ecological conditions in the area Promote economic development of the area which is compatible with the conservation objectives Help to maintain the lifestyle of the tribal people living in the area Prevent the commercial exploitation of the area Provide opportunities for scientific research, environmental education and tourism 												

Flora and Fauna

Plants naturally occurring in a particular area constitute the flora, and the animals naturally occurring in a particular area constitute its fauna. Teak, Jamun, Fern, Mango and Arjun constitute the flora of Pachmarhi Biosphere Reserve. Cheetah, Wolf, Leopard, Chinkara, Blue bull, Barking deer and Wild dog constitute the fauna of Pachmarhi Biosphere Reserve.