INDIA: GEOGRAPHY

India holds a unique position among the countries of the world. India is a country having largest democracy and its culture is one of the oldest in the world. It has the largest democracy in the world. The coordinating attitude of our culture has not discarded any religion, race or people, but has accepted them whole heartedly. Thus, impartiality towards all religions, people and races is the peculiar characteristic of India That is why India has become a "cultural confluence."

Even though many natural and man-induced disasters have taken place, India has consistently continued her progress. The geographical conditions have contributed immensely towards the development and progress of Indian culture.

India: Location, size and area:

Geographically, India lies in the northern hemisphere. It extends up to the southern part of Asian continent. The span of the mainland of India extends from 8° 4' to 37° 6' North latitudes and from 68° 7' to 97° 25' East longitudes. The Tropic of Cancer, which is located at 23° 5' north latitude and divides the country into two parts, passes almost through the middle of India. Its northern part is spread more in the east-west direction. The great plains and the Himalayan mountain system are located in this part. The area to the south of Tropic of Cancer has a triangular shape and tapers towards the south. This is basically a part of the peninsular plateau. It includes the eastern coastal plains and the narrow western coastal plains.

The latitudinal as well as longitudinal extents of India are almost equal, which is about 30°. The length between Ladakh to Kanyakumari is 3214 km and the width from Gujarat to Arunachal Pradesh is 2933 kilometres. There is a difference of two hours in the local times between the two extreme places starting from Gujarat in the west up to Arunachal Pradesh in the east due to the longitudinal difference. When it is sunrise in Arunachal Pradesh, it is still night time in Gujarat. The standard meridian of India is 82°30' east longitude. It passes through five states. Its local time is accepted as the standard time of India.

Total area of India is 32.8 lakh sq. km and India ranks seventh in the world in terms of area. Other six countries larger than India are (1) Russia (2) Canada (3) U.S. A. (4) China (5) Brazil, and (6) Australia.

The land area of India lies in South Asia. In the north, lofty mountain ranges are spread over hundreds of kilometres from west to east direction. That is why, the commuting with Tibet and China is possible only through passes located at high altitude. Bay of Bengal lies to the east, Arabian Sea to the west and Indian Ocean to the south of peninsular India. The sea is utilised as a waterway. Even though the land routes are obstructed by surrounding mountains, India has accepted all cultural elements arriving from outside, and these have merged into Indian society.

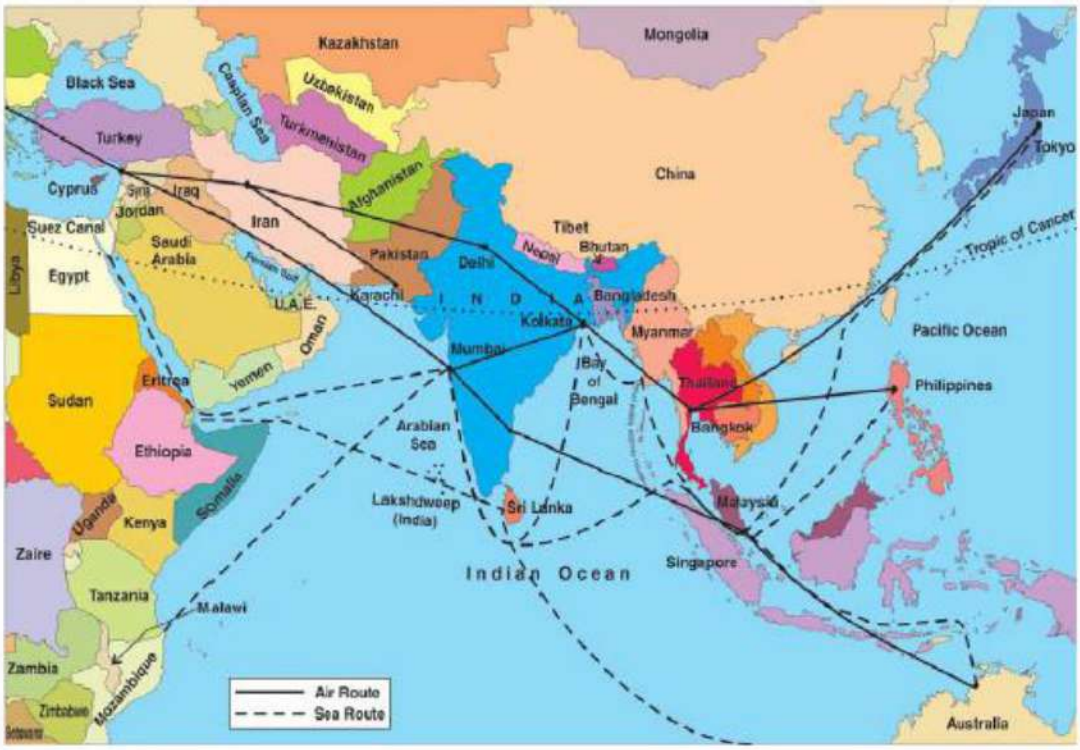


Fig.1 Strategic location of India

India holds a strategic location in eastern hemisphere and it has a strategic importance also. India is in the eastern hemisphere. Oceans have contributed immensely in developing mutual relations in ancient times. India had trade relations with East Africa, West Asia, South Asia and South-East Asia since ancient times. India had developed cultural and trade relations with them due to her location. No country in the Indian Ocean has a long maritime boundary as India has. Due to this strategic location, the ocean is named as Indian Ocean.

Location of India across the international waterways is also important. With the opening of Suez Canal in 1869, the distance between India and Europe has reduced by about 7000 kilometres. Sea routes connecting East and South-East Asia and Australia to Africa and Europe pass through the Indian Ocean. The Circum African waterway and Suez Canal waterway pass by India. Canada and U.S.A. can be reached through the same waterway via Strait of Malacca and the Pacific Ocean.

India has contacts with many countries since many centuries. Goods and ideas are being exchanged since ancient times. Similarly, concepts of Upanishads, stories of Ramayana and Panchtantra, therapeutic methods, Indian numerical figures and decimal system etc. could reach many parts of the world. India has an important location in South Asia. There are 28 States, 1 National Capital and 7 Union Territories in India.

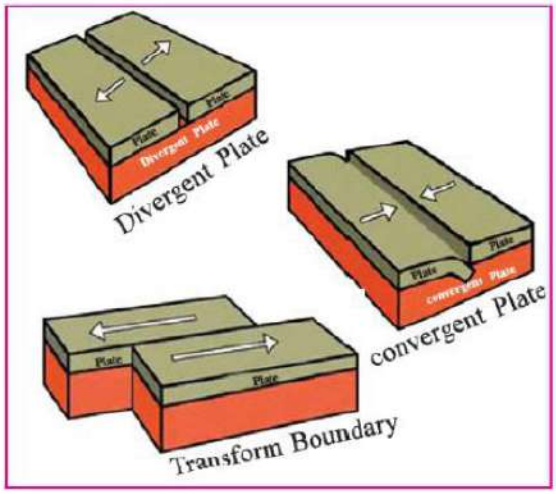
Neighbouring countries of India

India has a common land boundary with Pakistan and Afghanistan in north-west, with China, Nepal, Bhutan in north-east and with Myanmar and Bangladesh in the east.

In the south, Sri Lanka and Maldives are our maritime neighbours. India and Sri Lanka are separated by Palk Strait and Gulf of Mannar. Lakshadweep Islands are located in the Arabian Sea, while Andaman - Nicobar Islands are located in the Bay of Bengal.

Geological structure:

The current physiography of India is the result of tectonic and crustal movements of the earth. Both constructive as well as destructive effects of these movements can be seen.



The knowledge about the interior of the earth is very interesting. The crust of the earth floats over the semi-liquid rocks of the asthenosphere. Heat is generated due to the radioactive process in the interior of the earth. It tends to reach the surface of the earth by generating convectional currents. These upward currents break the upper layers into large pieces which are known as "lithospheric plates" or " tectonic plates". There are seven major tectonic plates. These are: (1) Pacific plate (2) North American plate (3) South American plate (4) Eurasian plate (5) African plate (6) Indo-Australian plate, and (7) Antarctic plate. At some places, these plates are drifting away from each other, which are known as divergent plates.

At some places these plates come closer to each other, which are known as convergent plates. Due to divergence and convergence processes, fold and fault take place. Due to the movements of these plates over millions of years, shapes of landforms as well as their locations have changed. The process of divergence is responsible for all the tectonic and volcanic activities on the earth. Wherever these drifting plates have collided with one another, it has resulted into mountain building process. Wherever these plates drift away, fissures are created within landforms and oceans. The continents situated along these fissures are drifting aparth continuously. Such plates are called divergent plates.

India was a part of a very vast and an ancient landmass known as the Gondwanaland. This large landmass consisted of the present South America, Africa, Australia and Antarctica. Over a period, the ' Indo-Australian plate ' started drifting gradually towards north. It is so believed that this plate collided with the large Eurasian plate before about five crore years. Due to the collision between Indo-Australian plate and the Eurasian plate, the Himalayan mountain system emerged out of Tethys Sea.

A large valley was formed to the south of the Himalayan system, wherein alluvial sediments were deposited by the rivers flowing from north and south of it. Thus the Ganga plain between Himalayas and the southern peninsula was formed. A huge volcanic eruption took place in the north-west of the peninsular plateau as a result of which the western portion of the plateau was disintegrated and was submerged. This led to the formation of Arabian Sea. Due to this submergence the Western Ghats became more distinct.

Thus, a large diversity is seen in the Indian sub-continent. Lofty mountain ranges are seen in the north. Many plateaus, summits and passes are seen within them. Ganga, Yamuna

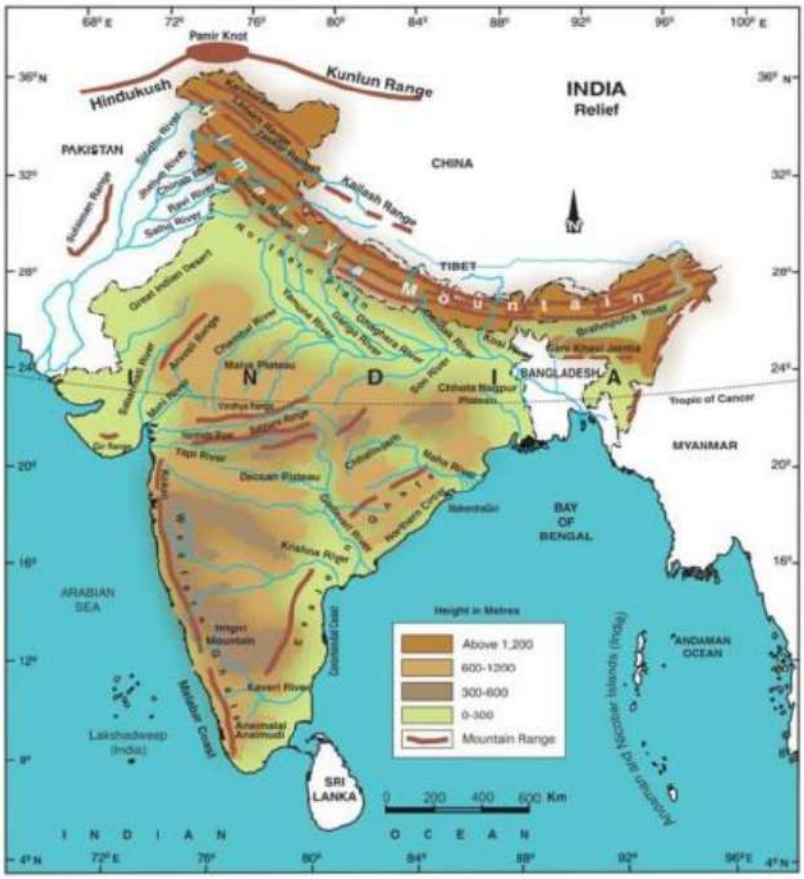
and Brahmaputra rivers flow in the northern plains. Their alluvial deposits have formed this plain. Two edges in the form of Ghats on two sides of the plateau and coastal plains are situated on eastern and western margins. Thus, India holds a diversified physiography.

The landform which is irregular and has some undulation on the surface of the earth is called 'Physiography'. It includes mountains, plateaus, plains etc..

Forms of Relief Features

On the basis of physiography, India can be divided into the following physiographic regions :

(1) Northern mountainous region
(2) Great northern plains
(3) Peninsular plateau
(4) The Coastal plains
(5) Archipelagos



India – Relief

1. Northern mountainous region

This is an important natural region of India. It is known as the Himalayan mountain system spread over 2400 km in west-east direction in the north. It has an arc shape. Its width ranges between 240 km to 320 kilometres. The Himalaya is not a single mountain, but is a complex of many mountain ranges. Going towards east from Afghanistan, it extends upto Myanmar via India, Nepal and Bhutan. It has more span in Tibet in the north. It is a part of the mountain system known as the Pamir knot.

Himalayas on the whole can be divided into two divisions :

(1) Northern Himalayan Region (2) Eastern Himalayas

(1) Northern Himalayan Region : There are three mountain ranges parallel to each other. The northern range is called the Greater Himalayas. This is the loftiest range among the Himalayas wherein there are more than 40 peaks which exceed height of 7000 metres. Most famous among them is Mt. Everest which is 8848 metres high. It is on Nepal – China border. It is known as Sagarmaththa in Tibet. Other famous peak is Godwin Austin or K^2(8611 m) which is the highest peak of India. There are three distinct ranges in Himalayas which are almost parallel to each other. In the Greater Himalayas, there are some high mountain passes such as Jelep La, Nathu La, Shipki La etc. Mansarovar (China), which is considered to be a sacred holy place is located in this range.

Like to know

Mt. Everest	8848 metres
K^2 (Mt. Godwin Austin)	8611 metres
Kanchenjungha	8598 metres
Makalu	8481 metres
Dhavalgiri	8198 metres
Annapurna	8070 metres

Second range, to the south of the Greater Himalayas is also spread in wider area. It is called Central Himalayas or the Lesser Himalayas. With a width ranging from 80 to 100 km, this range includes mountain ranges like Pir Panjal, Mahabharat, Nagtiba etc. Many hill stations have developed in this moderately high range. Some of these hill stations are Dalhousie, Dharamshala, Shimla, Mussoorie, Ranikhet, Almoda, Nainital, Darjeeling etc. Gangotri, Yamunotri, Badrinath, Kedarnath, Hemkund Sahib etc. are famous holy places. Kullu, Kangada and Kashmir are extremely beautiful natural valleys in this region.

Third range, situated in further south is known as Shivalik (Outer Himalayas) and most of it falls within India. It is about 10 to 15 km wide and has an average height of 1000 metres. Peculiar valley formations have taken place in this range which are covered by gravel, stones and thick sediments. Locally these are known as 'DUN', e.g. Dehra Dun, Patli Dun, Kothari Dun etc.

(2) Eastern Himalaya : Ranges situated in the eastern part of Himalayan ranges have lesser height. Some of them are more famous as Hills. These hills in eastern Himalayas are spread as smaller ranges. Among them, Patkai Hills are situated in Arunachal Pradesh, Naga Hills in Nagaland, and Lushai (Mizo) Hills in Mizoram. These hills are located near the eastern border and have their continuation in ArakanYoma range of Myanmar. Garo, Khasi and Jaintia Hills are in Meghalaya. Mountainous regions have more rainfall so dense forests have developed here. As this is a forested area, roads and railways have not developed much.

2. Great Northern Plain :

This northern plain is located between the northern mountainous region and the southern peninsula. This plain is formed due to the alluvial sediments brought by Himalayan rivers such as Satluj, Ganga and Brahmaputra. At some places, the layers of the sediments are about 50 metres thick. As these plains occupy very large area in North India, these are known as the great plains of Northern India.

The plain is about 2400 km long. It is considered as one of the largest river plains of the world. Its western part is narrower than the eastern part. The plain is almost a level land. None of its part is higher than 180 metres above sea level. The plain is very narrow near Delhi. The Satluj plain lies to the west of Delhi while the Ganga plain is in the east. This plain is considered to be the most prosperous region of India. Important cities such as Delhi, Kanpur, Lucknow, Allahabad, Varanasi, Patna, Kolkata etc. are situated in this plain.

Sindhu river and its tributaries Jhelum, Chenab, Ravi, Beas and Satluj originate in the Himalayas. Generally, a region between two rivers is called 'DOAB' (i.e. DO means two and AB means water). Thus the plain which is formed by five rivers is called 'Punjab' (Panj + Ab). Most of this plain is in Pakistan.

On the basis of physiography, the plain is divided into four parts : (1) Bhabar (2) Tarai (3) Bangar (4) Khadar. A small and narrow belt of gravels and stones lies parallel to the river from Sindhu up to Tista river in Shivalik foothills. This belt is almost 8 to 16 km wide. It is called Bhabar. The Terai region which is more humid and marshy comes next. Dense forests and diversified wild life are seen here. The old alluvium in the plains is called 'Bangar'. Due to consistent deposition, it develops a terrace shape which is at a higher level than flood plains. The new sediment of the flood is called 'Khadar'.

3. Peninsular Plateau

This is the oldest region of India. This region appears as an inverted triangle. Its average height is about 600 to 900 metres. Its northern part slopes towards north-east which is evident from the flow of Chambal, Son and Damodar rivers. The southern part slopes towards south-east. Most of its area is in south, hence it is also called Southern Plateau. As it is surrounded by sea on its three sides, it is called a Peninsular Plateau.

Peninsular Plateau can be divided into two parts (1) Malwa Plateau (2) Deccan Plateau.

(1) Malwa Plateau : Aravalli Range is situated to the north-west part of Malwa plateau. Aravalli is one of the oldest ranges in the world. It is a fold mountain. Mt. Abu is the famous hill station on this range. It is very beautiful and pleasant. Gurushikhar is its highest peak and it is 1722 metres high. To the south of this region, the rivers Chambal and Betwa, emerging from Vindhyachal, flow northwards and meet river Yamuna, while river Son flows northwards and meets river Ganga. It can be known from the direction of river flow that the region slopes northwards. The north-eastern part of this central upland is known as Bundelkhand. Besides this, rivers Luni and Banas also originate in the Aravalli range in north-east. These rivers vanish in the Rann of Kachchh while Sabarmati and Mahi rivers meet the Gulf of Khambhat. From the flow of these rivers, it can be ascertained that the western part of Malwa Plateau slopes towards south-west. Rajmahal Hills and Shillong plateau are a part of Chhota Nagpur plateau, which also includes Ranchi plateau.

(2) Deccan Plateau : The Deccan Plateau is situated to the south of Satpuda, Mahadev and Maikal ranges which are located to the south of the Malwa plateau. The north-western parts of the plateau are composed of lava deposits. On the western side, its border is demarcated by Western Ghats which runs north-south along the Arabian Sea coast. It has several local names. It is known as Sahyadri in Maharashtra and Karnataka, as Nilgiri in Tamil Nadu, as Annamalai and Cardamum ranges along the border of Kerala and Tamil Nadu. The southern portion of Western Ghats is more lofty.

Generally the average height of Deccan Plateau ranges between 900 to 1000 metres, but at a few places it exceeds that height. Few isolated hills having more than 900 metres of height form the eastern boundary of this plateau. This is called 'Eastern Ghats'. It has a general slope towards south-east which is evident from the direction of the flow of the rivers. Except rivers Narmada and Tapi which flow westwards, most of the rivers of Deccan Plateau flow eastwards and meet the Bay of Bengal.

4. Coastal Plains (Plains along the sea coast) :

Peninsular plateau is surrounded by a narrow belt of plains from Kachchh to Odisha. It is divided into western and eastern coastal plains. The west coast plain extends from Gujarat to Kerala. Except in Gujarat, the plain is mostly narrow. It is very much undulating and is known as Malabar Coast to the south of Goa. West coast rivers have developed creeks at their estuaries. Most of these creeks are submerged valleys under river water. These are formed due to the emergence of sea shore. It provides favourable conditions for fishery. There are many natural ports on the western coast, which include Mumbai and Marmagao. Backwaters have developed along the southern coast of Kerala, and these are known as **Kayal** in local language.

East coast plain is much broader than the west coast plain. There is substantial alluvial deposition in the deltas of Kaveri, Krishna, Godavari and Mahanadi. Its northern coast is known as North Sircar Coast and the Tamil Nadu coast is known as Coromandel coast.

(5) Archipelagos

There are few archipelagos in India. Andaman – Nicobar and Lakshadweep are major archipelagos among them. There are many smaller islands in Lakshadweep and these are located at some distance off Kerala coast. These islands have a horse-shoe shape. Such coral islands are called 'Atolls'.

Andaman – Nicobar islands, are situated in the Bay of Bengal. Here, the number of islands is also more and these are situated very far from Indian coast. There are few mountain ranges, some of which are formed due to the volcanic activity. These islands are spread over 350 km and have a strategic importance.

Like to know

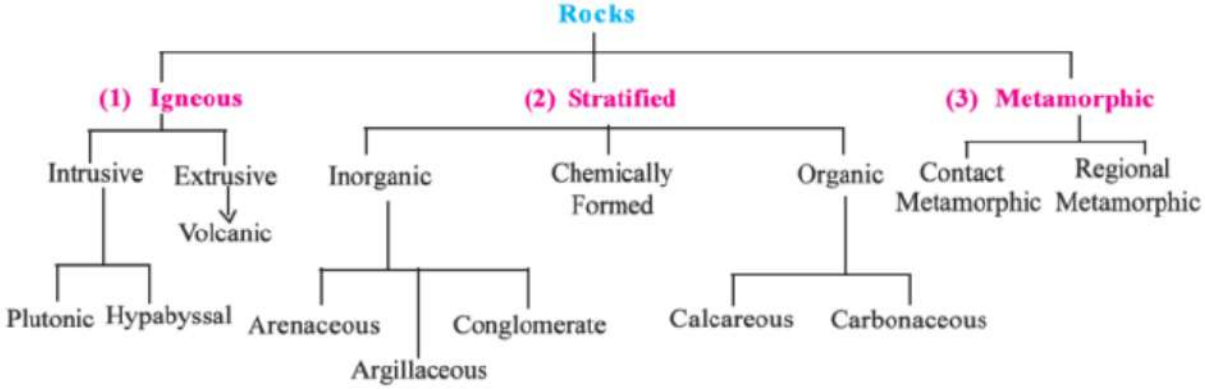
The only active volcano in India is in 'Barren' Island in Andaman – Nicobar archipelago. Narkondam, which is very near to it is a dormant volcano.

Thus there is a diversity in the physical features of India. Every region has its own distinct characteristics and yet all regions are inter connected. All of them have important contribution in the progress of the nation and are useful in the forest resources. Northern fertile plains are also called Storehouse of Grains. Southern plateau is rich in many mineral resources which has enhanced the national progress. Many rivers with large volume of water originate in the northern mountainous region which is also known for a variety of forest resources.

Rock :

A composite matter made up of one or more minerals is called a 'Rock'. Rocks can be hard as well as soft. They can be porous or non-porous, and can be light or heavy in weight. Various types of rocks are formed due to different processes. Rocks can be divided into three categories on the basis of their formation. These are :

(1) Igneous rocks (2) Stratified rocks (3) Metamorphic rocks



(1) Igneous Rocks : The intense heat in the interior of the earth is responsible for the formation of these rocks. The interior of the earth remains very hot due to this heat. So the matter here is in semi liquid state, which is called as 'Magma'. Eventually when this magma cools down, rocks are formed. These rocks are formed due to the effect of heat, hence these are called Igneous (Agneya) rocks. In the formation of the crust of the earth, these rocks were formed earliest, so these are also called primary rocks.

At many places in Rajasthan, Madhya Pradesh and southern peninsula in India, such rocks have formed. Igneous rocks are most solid of all rocks. Granite is a well known example of plutonic rock. Basalt is also this type of rock.

(2) Stratified Rocks : Igneous rocks disintegrate due to the collective effect of water and other forces. These are also known as Sedimentary rocks. The broken rock material is constantly deposited in water and they form layers. Thus, rock material is deposited into different layers. The upper layers exert pressure over the layers of underlying rocks, which were formed initially and are lying at the bottom, and eventually rocks are formed with different layers. These are called 'Stratified rocks'. Its examples are gypsum, limestone and coal. Coal and gypsum are obtained from Bihar and Jharkhand states.

(3) Metamorphic Rocks : In certain peculiar conditions, the form, composition and other characteristics of rocks are totally changed. Due to the combined effect of two factors high temperature and pressure of rock strata, the igneous and sedimentary rocks change into a totally new form. These newly formed rocks are known as Metamorphic rocks.

Marble and quartzite available in Rajasthan are their best examples.

Mineral

'Mineral' is that matter which is formed due to natural organic or inorganic process and has a specific chemical composition. Minerals are available from the interior of the earth in solid, liquid and gaseous forms. Minerals depend on the geological structure of the surface of the earth. Minerals such as iron, copper, nickel, gold, silver etc. are found in igneous rocks. Coal, mineral oil and natural gas etc. are available from stratified rocks, while slate, marble, diamond etc. are available from metamorphic rocks.

Classification of minerals : In our routine life, about 200 minerals are used directly or indirectly. A universally accepted classification of minerals is not possible. However, a general classification can be done as follows :

(1) Metallic minerals :

(a) Precious metallic minerals : Gold, silver, platinum etc.
(b) Light metallic minerals : Magnesium, bauxite, titanium etc.
(c) Minerals of general use : Iron, copper, lead, zinc, tin, nickel etc.
(d) Minerals used alloys : Chromium, manganese, tungsten, vanadium etc.

(2) Non – Metallic minerals : Limestone, chalk, asbestos, mica, fluorspar, gypsum, sulphur, diamond etc.

(3) Energy resources : Coal, mineral oil and natural gas, uranium, thorium etc.

Major minerals and their spatial distribution

Serial	Mineral	States
1.	Iron	Jharkhand, Chhattisgarh, Andhra Pradesh, Goa, Odisha, Tamil Nadu, Maharashtra, Rajasthan, Karnataka, Bihar, Madhya Pradesh
2.	Manganese	Karnataka, Odisha, Madhya Pradesh, Maharashtra, Goa,
3.	Copper	Gujarat, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan Sikkim, Meghalaya, Maharashtra, West Bengalm M.P., Jharkhand
4.	Bauxite	Odisha, Andhra Pradesh, Chhattisgarh, Maharashtra, Jharkhand, Gujarat
5.	Lead	Rajasthan, Andhra Pradesh, Tamil Nadu, West Bengal, Madhya Pradesh, Uttar Pradesh, Odisha, Maharashtra, Meghalaya, Sikkim, Gujarat
6.	Mica	Andhra Pradesh, Rajasthan, Bihar, Jharkhand
7.	Limestone	Madhya Pradesh, Chhattisgarh, Andhra Pradesh, Rajasthan, Gujarat, Karnataka, Himachal Pradesh

Soil :

We know that soil is the basic resource for agriculture. Besides agriculture, soil is also very important.

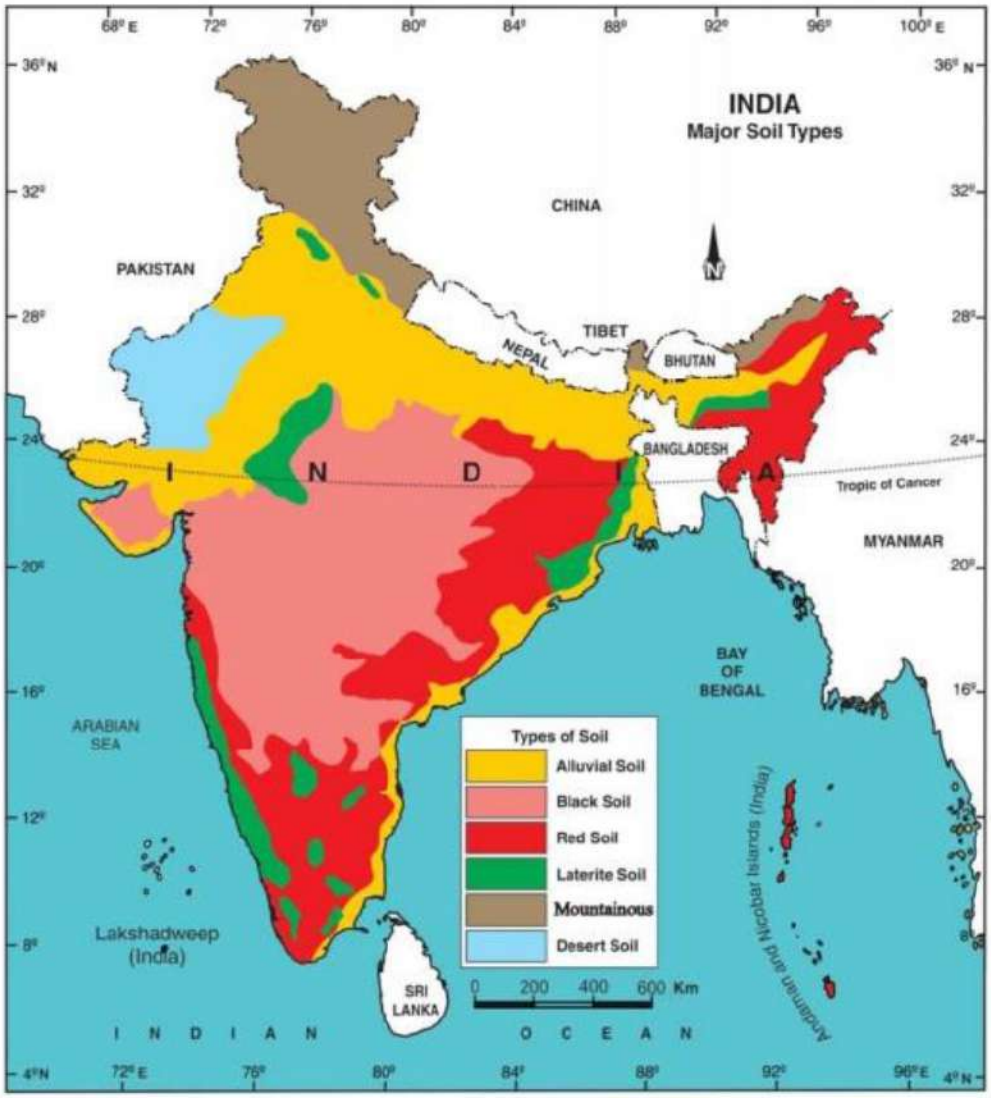
Soil is a thin layer formed of the organic and inorganic matter on the surface of the earth. Soil is related to the surface of the earth in the same way as the apple with its skin. The thin layer on the crust of the earth is called soil.

Soil Formation : Soil is the result of denudation of rocks. The rock surface is eroded due to factors like temperature, rain, snow, air, vegetation and insects and it turns into powdery form. Thus it forms the land layer. In this layer, there are gravels, smaller stones, pebbles, soil particles etc.which are known as 'Regolith'. It contains only mineral contents. Then the biotic matter, air and water are mixed with it. Finally soil is formed out of this mixture. The process of soil formation is a long term process.

Soils in India : Soils in India are classified into six types :

(1) Alluvial Soil (2) Black (or regur) soil (3) Red soil (4) Laterite soil (5) Mountainous soil

(6) Desert soil.



Major Types of Soil

(1) Alluvial Soil : Alluvial soil can be divided into two types : (1) Khadar, and (2) Bangar. The soil formed due to the fresh alluvial deposit is known as Khadar soil. As this soil is formed due to the river floods, it is found mostly nearby the rivers. Generally such soil is sandy. Soil containing old alluvium in the upper valley region of a river is called Bangar soil. It is sticky and has dark colour. Alluvial soil is seen in many parts of the country. Their fertility is also different at different places. Generally, such soil is very fertile. It is found in Punjab, Uttar Pradesh, Bihar, West Bengal etc.

(2) Black Soil : This soil is found mostly in Maharashtra, western Madhya Pradesh, Gujarat, Karnataka, Andhra Pradesh, Telangana and Tamil Nadu. Black soil is the gift of peninsular plateau. This soil is very sticky and fertile. It can retain humidity for a prolonged time. It is formed from the igneous rocks and is very useful for cotton cultivation. That is why it has become famous as Black Cotton Soil. It is also known as regur soil.

(3) Red Soil : Such soil is found in regions of igneous and metamorphic rocks. Its red colour is due to its ferrous and other humus contents. The soil is porous and fertile. Such soil is seen in Goa, Tamil Nadu, Karnataka, Andhra Pradesh, Odisha and Jharkhand.

(4) Laterite Soil : Laterite soil develops as a result of excessive erosion by rain. Due to heavy rain, the humus contents from the top soil descend into the lower strata which is called leaching. As the soil contains less humus, it is less fertile. The red sandstones contain iron and aluminium. The erosion of these rocks results into its red colour. Such soil is found in mountainous region of Deccan, Karnataka, Kerala, Odisha and some parts of North-East.

(5) Mountainous Soil : Humus content is more due to the forests, although it differs from place to place. Such soil on Shivalik Range is less fertile and less developed. The soil is sandy and porous and does not contain humus. Such soil is found in the mountainous region of the country, such as in Meghalaya, Arunachal Pradesh, eastern hill ranges, Uttarakhand, Himachal Pradesh and Jammu-Kashmir and Laddakh (Union Territories).

(6) Desert Soil : Such soil is found in the arid and semi-arid regions of Gujarat, Rajasthan, Punjab and Haryana. The soil here is more alkaline and has less humus contents. Agriculture has been made possible in such soil only through irrigation.

Thus, a large diversity in soils of the nation is seen due to diversity in climate and relief features.

INDIA: NATURAL VEGETATION

Vegetation is an important part of human life. It is difficult to imagine life without vegetation. Its importance has been accepted by our ancient scriptures and by modern science.

India has a large diversity of natural vegetation. In terms of vegetation diversity, India holds tenth position in the world and fourth in Asia. A forest is a group of trees, and those trees which grow in natural conditions without human help are called Forest.

Natural Vegetation

The diversity in natural vegetation of India is created due to the following reasons: (1) Relief features (2) Soil (3) Temperature (4) Insolation (sunshine) (5) Rainfall (6) Humidity

Due to the diversified relief like mountains, plateaus, plains, deserts etc. a diverse pattern m vegetation is seen in India. There are different soils e.g. alluvial, black, mountain, desert type etc. in India. This variation in soils also creates differences in vegetation. The difference in temperature and humidity in cold Himalayan regions and in southern peninsular region also brings variations in vegetation. The insolation over any place depends on its latitude and altitude. Vegetation grows faster where there is more rain and insolation. Thus, there is a diversity in vegetation due to sunshine. Rainfall distribution in India is also unequal which in tum causes diversity in vegetation.

There are about 5000 varieties of trees in India, out of which 450 trees are useful commercially. Besides, about 15,000 flowering plants also grow which form about 6 % of the world. Non-flowering plants like fem, algae, moss etc. are also found in our country. India is famous since ancient times for the herbal plants. About 2000 medicinal plants arc described in Ayurvcd. Thus it can be said that India has a diversity in vegetation.

Types of Natural Vegetation

Existence and growth of any vegetation depends on the climate of a region. In the regions of identical climate, the vegetation seen is mostly identical. Regions of such ecological similarities are called Natural Vegetation Regions.

On the basis of altitude, soils, rainfall and variations in temperature, the natural vegetation regions can be divided into five types :

(1) Tropical Rain Forests (2) Tropical Deciduous Forests (3) Tropical Desert Vegetation (4) Temperate Forests and Grasslands (5) Mangrove (Tidal) Forests

(1) Tropical Rain Forests

Distribution: Tropical Rain Forests are found in hot and humid regions where annual rainfall exceeds 200 cm and temperature is more than 22° C. Such forests are found in areas of heavy rainfall of Western Ghats, Lakshadweep, Andaman - Nicobar Islands, upper regions of Assam, coastal Tamil Nadu.

Trees: Trees found here are mahogany, ebony, rosewood, rubber etc.

Characteristics: Trees here are about 60 metres tall or even more. There is more humidity due to scrubs. There is no season here like autumn. As these trees are evergreen, the forests are also called Evergreen Forests.

(2) Tropical Deciduous Forests:

Distribution: Generally, such forests are found in the regions receiving about 70 to 200 cm rainfall. Such forests are found in North- Eastern States, Himalayan foothills. Western Odisha, Chhattisgarh, Jharkhand, eastern slopes of Eastern Ghats, Vindhya and Satpuda ranges. There is a large proportion of these forests n India.

Trees: Major trees found here are teak, saal, sesame, sandalwood, kher (acacia catechu) bamboo etc.

Characteristics: A major characteristic of the trees here is that the trees shed their leaves for 6 to 8 weeks during autumn. Every species has a different time to shed the leaves, so all the trees are never without leaves during any particular season. As these trees shed their leaves according to seasons, these are also called Monsoon forests.

(3) Thorny Vegetation:

Distribution: Generally, such forests are found in the regions receiving less than 70 cm of rainfall. These are found in North-Western region, Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh etc.

Trees: Jujube, acacia, cactus, khijdo etc. are common trees found here.

Characteristics: The roots of the trees and plants here are long, deep and widespread. Leaves are shorter which result in slower evapotranspiration process.

(4) Temperate Forests and Grasslands (Himalayan Vegetation)

A major characteristic of the coniferous forests is that the trees have conical shape. Their branches lean towards the surface so that the snow would easily slide down towards the land. Tree leaves are long, pointed and sticky which can conserve humidity for longer time.

Vegetation on Himalayas

Height	Areal span	Forests	Trees
1000 to 2000 metres of Himalayas	High mountains of North -East, West Bengal and mountainous area of Uttarakhand	Tropical forests	Oak and chestnut Major vegetations
1500 to 3000 metres of Himalayas	Southern slopes of Himalayas, higher areas of South and North-East	Coniferous forests	Pine, deodar, silver
3600 metres and more of Himalayas	Higher altitude in Himalaya and near snow line	Alpine and short grass	Silver fir and Junifur birch

(5) Tidal Forests (Mangroves)

Distribution: Tidal forests are located in the delta regions of rivers along the coast. These forests are found along Gujarat coast and in the marshy lands along the Bay of Bengal coast.

Trees: Sundari and cher.

Forest products and their utility

Forests are useful to mankind in many ways. Timber wood from teak and saal is used for furniture making. Boats are prepared from the wood of sundari trees of Sundarvan. Sports goods and packing boxes are prepared from the wood of pine and chid trees. Turpentine is prepared from the liquid of chid trees. Sandalwood is used to prepare perfumed oil, cosmetics etc. Baskets, toys, goods of home decoration etc. are made from bamboo trees. Forests also provide lac (sealing wax), resin, gum, rubber, honey, cane etc. Amla (embellicmyrobalan), baheda, harde, ashvagandha etc. hold medicinal utility.

Medicinal Utility of Vegetation	
Vegetation	**Medicinal Utility**
Sarpagandha	In high blood pressure
Limdo	As bacterial resistant
Tulsi	Cold, cough and fever
ArjunSadad	Treatment for heart ailments
Bili	Gas and cough impurities
Galo	Diabetes, fever, joint pain
Harde	Constipation, hair diseases
Amla	Cures gas, acidity, digestive
Karan]	Skin and dental - gum diseases

Besides leaf plates from khakhro leaves, catechu from kher tree, bidi from timru leaves are also prepared. Forests provide livelihood and food to forest dwellers. This way forests contribute into the social and economic development of mankind.

Environmental Importance of Forests:

The environmental importance of forests is as follows

- Forests are useful to bring rain.
- They control the atmosphere from becoming adverse.
- They provide life saving oxygen.
- Forests control the floods.
- They absorb harmful gases like carbon dioxide.
- Forests prevent soil erosion.
- Forests maintain ground water.
- Forests restrict the advancing deserts.
- Forests are useful in reducing air pollution.
- Forests enhance the natural beauty.
- Forests purify the air.
- Provide natural habitat to the wildlife.
- Forests are ideal places for adventurous, tourism activities.
- Some forests are reserved with reference to National Parks and Sanctuaries and bio diversity.

Forest conservation

Ecosystem is formed due to the interrelation of biosphere mankind. But due to the anti-environmental activities and selfishness of man, the ecosystem is disturbed. Man's insatiable desire to procure land is responsible for the destruction of forests. Forests are destroyed also due to increasing population, policy of establishing industrial units away from residential areas,

urbanization, multi-purpose projects, construction of roads, jhoom cultivation, to get timber and fuel wood, forest fire etc. Ecological balance is disrupted due to the destruction of forests.

Adverse effects are noticed due to forest destruction. These include decrease in rainfall, drought, global warming, green house effects, advancing deserts, shelter lessness of wild animals etc.

According to the National Policy of 1952, there must be forests over 33 % of the total geographical area of the nation. In India, forests are spread over about 23 % area while forests occupy only about 10 % of land in Gujarat. Thus, it is necessary to prevent destruction of forests, and so protection and conservation of forests is necessary.

Remedies to conserve forests:

In order to protect and conserve forests, The Government of India implemented a National Forest Policy in 1952. In 1980, the parliament passed Legislative Act and in 1988 a new National Policy was announced. Following steps should be taken to preserve forests.

(1) Forests are our nation's resource. Take it as our moral duty to protect them.

(2) Tree felling should be stopped. Heavy punishment must be inflicted to those who cut trees illegally.

(3) To increase public participation in VanMahotsav and Social Forestry, trees must be planted on either side of waste land, river, railway tracks and roads and raise them.

(4) Create awareness about environment through environmental education and school syllabus, celebrate environment related days.

(5) Take precautions to avoid forest fire, and in case of fire it must be doused immediately.

(6) Use renewable energy resources such as solar energy, bio energy, wind energy etc. in place of traditional resources like wood which is used to get energy.

(7) Explain the importance of forests to people through broadcasting media and bring public awareness about it.

INDIA: WILD LIFE

India has a diversified relief and climate. Similar diversity is seen here in the wild life. In the entire world, about 15 lakh species of wild life are recorded of which 81, 251 species are found in India. These include reptiles, mammals, fish and other insects. Explorations continue to identify other animals found in different forests. India is at sixth position among the countries rich in bio-diversity.
India has less forest cover. Compared to that its wild life diversity is noticeable.

Animal- Geographical Regions of India

Natural vegetation regions have been devised on the basis of their characteristics. Similarly, a spatial distribution can be made for animals. The wild life of India is divided into 9 zones according to the similarities in their characteristics and their existence in any region: These are as follows:

(1) Himalayan region (2) Ladakh and dry cold area (3) Forested Region in lower Himalayas (4) High lands without forest cover in Upper Himalayas (5) Northern Plain (6) Desert of Rajasthan (7) Peninsular Plateau (8) Sea coast and (9) Nilgiri Hills
Bio - diversity is studied according to these Zoo - Geographical regions.

The diversified Wild Life of India

The vast alluvial plains of rivers, peninsular plateau, mountainous regions, swampy areas, sea coasts, dense rain forests, deciduous forests, coniferous forests in Himalayas and other higher regions form a vast background for the habitation of wild life in India. The animals seen are Asian elephant in peninsular rain forests, one horned rhino in swampy Brahmaputra river, snow leopards in higher Himalayas, wild goats and musk deer in Jammu - Kashmir, wild buffalo (Indian Bison), tiger in Central India and West Bengal, Ghudkhar (wildass) in Little Rann of Kachchh and flamingo in water logged Greater Rann. Presence of Great India Bustard in the grassland area is noted again. In the water logged areas, migratory birds from cold regions come down in great number. These include Siberian crane, pelican, Tibetian duck, kunj, karkara etc. Flying squirrels are seen in the dense forests of Western Ghats. Nicobari dove is a rare bird seen in Nicobar island. Rare species of corals are seen in the Gulf of Kachchh and Lakshadweep Islands. Along with mammals and many types of birds, notice should be taken of king cobra, snakes, python, iguana (patlagho) also. Along sea coasts and other water bodies, various fishes, sea snakes, dolphin, shark, dugang (sea cow), octopus, whale etc. form a part of animal world.

Besides forests, animals like fox, wolf, nilgai, deer, mongoose, rabbits, wild hog, hedgehog are seen in agricultural areas. Many birds such as nightingale, parrot, peacock, weaver bird, chibari, pilak, vulture, kabar, dhor bagla etc. are also seen roaming in these areas.

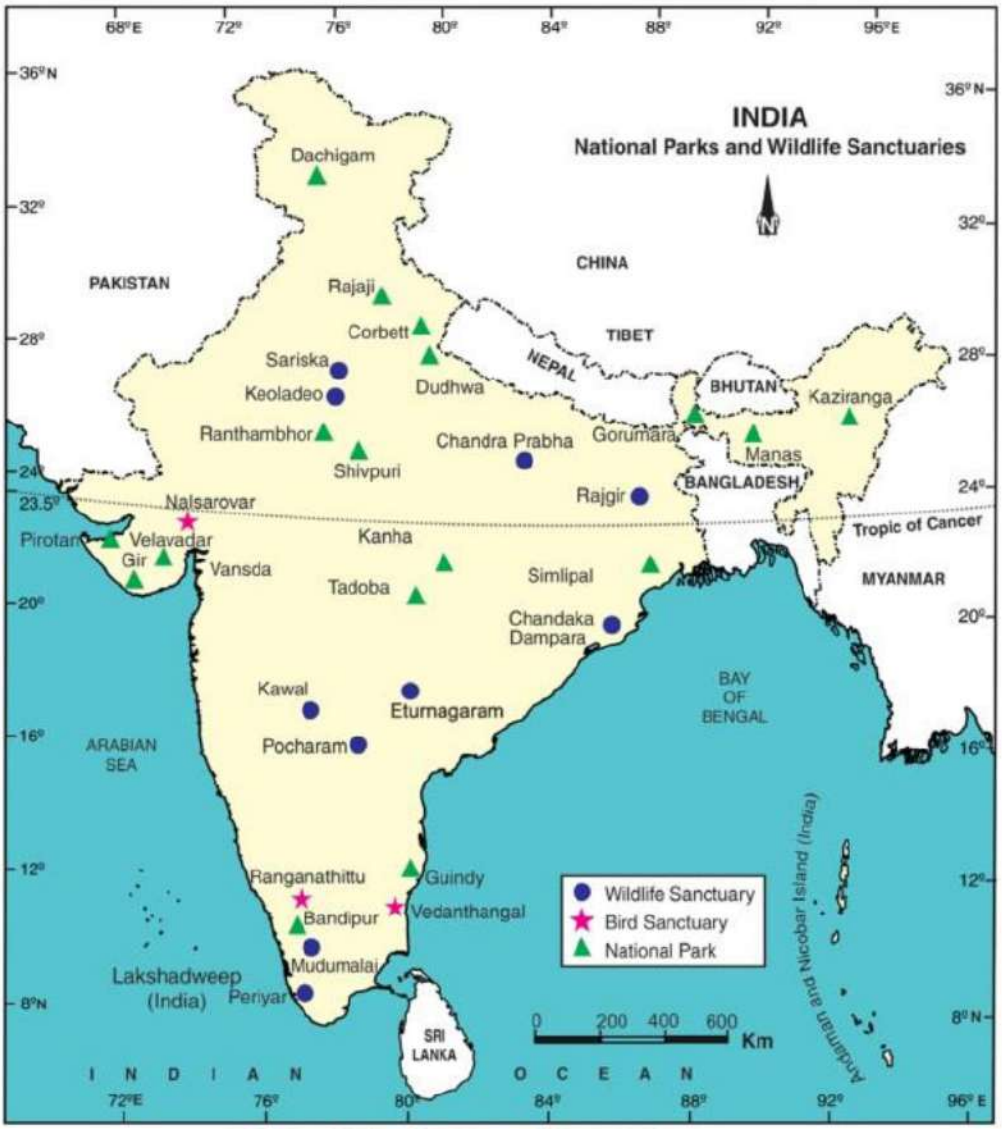
Wild Life and the need for conservation

While going through the past, it becomes evident that there is a danger to the existence of the wild life since last few decades. Before one hundred years, thousands of tigers were seen in India. As per the figures of 2014 given by Forest and Environment Ministry, the figure is 2226. Tigers have grown in numbers which is evident from the imprints of their foot taken during last few years. This is a good sign. Vultures are on verge of becoming extinct due to eating the meat which becomes polluted by diclofenac drug used in the treatment of sick milch cattle. Asiatic cheetahs, seen in the forests in the beginning of twentieth century have become extinct from India. Once the Asiatic Lions of Gir which were seen even upto middle east, are now restricted to Gir forests only. With due steps taken for their protection, now their number is 523. Once cranes were seen in large number in Gujarat, but now their number is reduced. Wild life is an inseparable part of the living organisms, but the decrease in their numbers somewhere and during few years reduces the quality of environment, which is a matter of concern. Shyam Garud (eagle), a resident of mountainous forests in Gujarat is now rarely seen. Chilotro, seen in the forests of Vijaynagar taluka, of Sabarkantha District, is also rarely seen to-day.

It is obvious that endless human greed and the run for progress, have made environment imbalanced which would bring adverse results. Still there is time. If proper actions are not taken then the next generation would see the wild life only in pictures.

Important National Parks and Sanctuaries of India.

Sr.No.	National Park	Sanctuary
1	Kaziranga (Assam)	Rhino, wild buffalo, deer
2	Thar Desert (Rajasthan)	Desert wolf, desert cat, bustard
3	Kanha (Madhya Pradesh)	Tiger, antelope
4	Gir National Park (Gujarat)	Lion, leopard, chital
5	Velavadar Kaliar National Park (Gujarat)	Black buck, wolf, peacock, bustard
6	Kevladev (Bharatpur - Rajasthan)	Birds (migratary and local)
7	Bandipur (Karnataka)	Elephant, bear, hog, wild cat
8	Dachigam Jammu (Union Territory)	catHamur(Kashmiri deer), musk deer
9	Corbett (Uttarakhand)	Tiger, elephant, leopard, deer



India : National Parks and Sanctuaries

Dangers to Wild Life

A question mark has been put against the existence of entire wild life due to the human greed and development in recent times. On examining the reasons, it is understood that the wild life has become unprotected as they have lost their natural habitat due to continuously decreasing forests. Hunting, carried out to get skin, meat, teeth, hair and bones, is a big problem. Due to heavy grazing by domestic animals in the forests, herbivores are deprived of their food which results in decrease in their numbers. It will deprive carnivores of getting their food. So these carnivores reach human settlements in search of food and attack domestic animals. As they approach human settlements, situation of conflict arises between wild animals and human beings. This conflict leads the destruction of wild life. Besides, the human activities in forest cause adverse effects on wild animals.

Due to the decrease in the forest area, the wild animals occasionally come within the human habitation. Human interference in areas of wild animal results into clashes with them. In such incidences, wild animals become victim of human rage and lose their lives. In South and South•

Eastern India, elephants coming in search for food create havoc in the agricultural fields. Incidences of injuring or killing men by leopards take place in Saurashtra and South Gujarat and by wolf in the forests of north-eastern Gujarat. A precaution is necessary to prevent such disasters.

Remedies to conserve Wild Life

A long-term planning is necessary to conserve and increase forest areas. We shall have to be more dedicated to implement strong legal provisions and their strict implementation for the conservation of forest areas and wild animals. Various social NGOs should give this a top priority and arrange public awareness programmes. These problems should be included in the school syllabus and make the future citizens aware. Before implementing any developmental project, its probable effects on environment and living organisms should be examined. Cutting of large trees outside the forests area should be stopped, because the hollow space within them and their branches are nesting place for birds. Ponds, farm ponds and wetlands, which are necessary for migratory birds and for those which are habited near any water body, should be protected. An active action is urgently needed to reduce pollution. To manage the forest fire an anticipatory planning should be made for patrolling and safety.

Steps taken to Preserve the Wild Life

Since early times, laws have been framed in our country to protect the wild life. Laws were framed to protect wild life in the time of great Maurya King Ashok. Fundamental Duties of citizens and Directive Principles in the constitution also include these things. Parliament has passed a Wild Life Conservation Act according to the recommendations of Indian Wild Life Board. In 2014, there were 503 Sanctuaries, 102 National Parks and 14 bio - reserves. Of these, 22 sanctuaries, 4 national parks and 1 bio reserve zone happen to be in Gujarat. Some protection schemes are planned for those species which are on verge of extinction. Let us know about some of these projects.

Project Tiger: This Project was launched in 1973 against hunting and decreasing number of tigers. This was implemented for 9 reserved areas, under which now 48 areas are covered.

Lion Project: There was a time when Asiatic Lions were found up to Iran in the Asian subcontinent. Due to hunting and the reduction in forest area, these lions are now restricted to Gir forests of Saurashtra Peninsula. At one stage, their number had gone below 100. In 1972, a project was started in Gir to protect the Asiatic Lions. As a result of this Project and the timely taken steps, there are now 523 lions according to the Lion Census held in 2015.

In addition to this, there are other projects also. Major projects among them are Hangool Project for the rare species of Barasinga deer in Kashmir, Crocodile Project for saline water crocodiles, Rhino Project for the protection of Indian Rhino and Snow Leopard Project.