Chapter - 16

Biotic and Abiotic Resources

In previous lesson, the Classification of resources tells us that on the basis of origin, the resources are divided into (A) Biotic (B) Abiotic. All living organisms are included in biotic resources whereas abiotic resources includes-land, water, minerals etc. On the basis of study and importance, in this lesson we will study animals, forest and fisheries in biotic resources and land, water and minerals in abiotic resources with special reference to India.

Animal Resources

India has been a rural and agricultural country since ancient times. So in agriculture and allied works, the importance of animals is significant. Animals have played an important role in transportation and production of milk, curd, butter, ghee, paneer, buttermilk, wool, leather, compost manures etc.Due to the special importance of live stocks animals, it is absolutely reasonable to say animal resources in place of livestock. Explaining the importance of livestock in India, Dr. Darling writes "In absence of livestock, the field remain unploughed, barn food grains lying empty and it is very sad that a vegetarian nation can face famine of milk, ghee, paneer, butter and many healthy products. "With modern day development, the importance of livestock and dependency on them for physical works is decreasing due to tractors, harvesters, pumps, canals and electricity. The importance of livestock in India can be understood by-

(1) Bulls, Camels and Buffaloes are used in agricultural works such as ploughing, Pulling water from wells, transportation of crops produce and fodder etc.

(2) We get nutritional products such as milk, cheese, curd, butter, ghee, buttermilk, milk powder etc. from animals.

(3) Manure is made form animals dung and bones.

(4) We get produce leather from animals. In India in the year 2013, 3.5 crore kg wool is to make clothes, blankets, namda and light rugs.

(5) In India livestock animals are used as a means of transport. Such as in desert-camels, hill areas- ponnies, donkeys and horses. We don't have alternatives in such regions

(6) In India there are around 4000 slaughter houses. In the year 2015-16 ,30137 crore rupees of meat and related products were exported.

(7) 20% of livestock of the world is found in India.

(8) In India 12.7% of Cows, 56.7% Buffaloes, 14.5% Goats, 5.96% Sheeps, 2.4% Camels, 1.5% Pigs, 3.1% Chickens, 1.4% Horses, Ponnies, Donkies and 42 thousands Yaks of world are found.

(9) Various type of artifacts and shoulders are made from horns of animals.

(10) In India, 30% of the gross agricultural products is received from animal resources, which valued around 450 billion rupees.

Animal Husbandry in India

Animal husbandry along with agriculture is a common practice in all rural areas of India, but there are some regions in which animal husbandry is an important occupation. Even today ,many castes lead their lives on grazing and rearing animals. Important areas of animal husbandry in India are as follows :-

(1) Himalayan Mountain Region

This region include Uttarakhand (Kumaon & Garhwal), Himachal Pradesh (Kangra, Kullu valley and Shimla), Jammu and Kashmir, Tarai regions of Himalayas, Assam & North-eastern States of India. Due to hilly mountainous regions, sheeps and goats are primary domestic animals. And from these fine quality of white wool is received. In this region,due to continuous increase in demand for milk is increasing, leading to increase in milk animal husbandry.

(2) North-western climatic zone

This major animal zone is spread over the Thar desert and nearby arid and semi arid in region. Animal husbandry is the main occupation in place of agriculture due to low precipitation. This region covers the states- Punjab, Haryana, Delhi, North-Western Uttar Pradesh, Rajasthan and Western parts of Gujarat and Madhya Pradesh. Irrigated parts of this region produce wheat and wheat straw is used as fodder for livestocks. In the rainy season, millets and natural fodder are used as fodder for animals. Mainly camels, sheeps, goats, cows, horses, donkies and mules are reared.

(3) East and Western Coastal Regions

It includes Eastern UP, Bihar, Western Bengal, Assam, Odisha, Andhra Pradesh, Eastern Tamilnadu and Kerala's Western Coastal belt. This region has adequate rainfall and temperature which is suitable for growing rice crops. Rice straw and cherri are used as main fodder. Milk is obtained and agricultural works are done with buffaloes.

(4) Region with Medium Rainfall

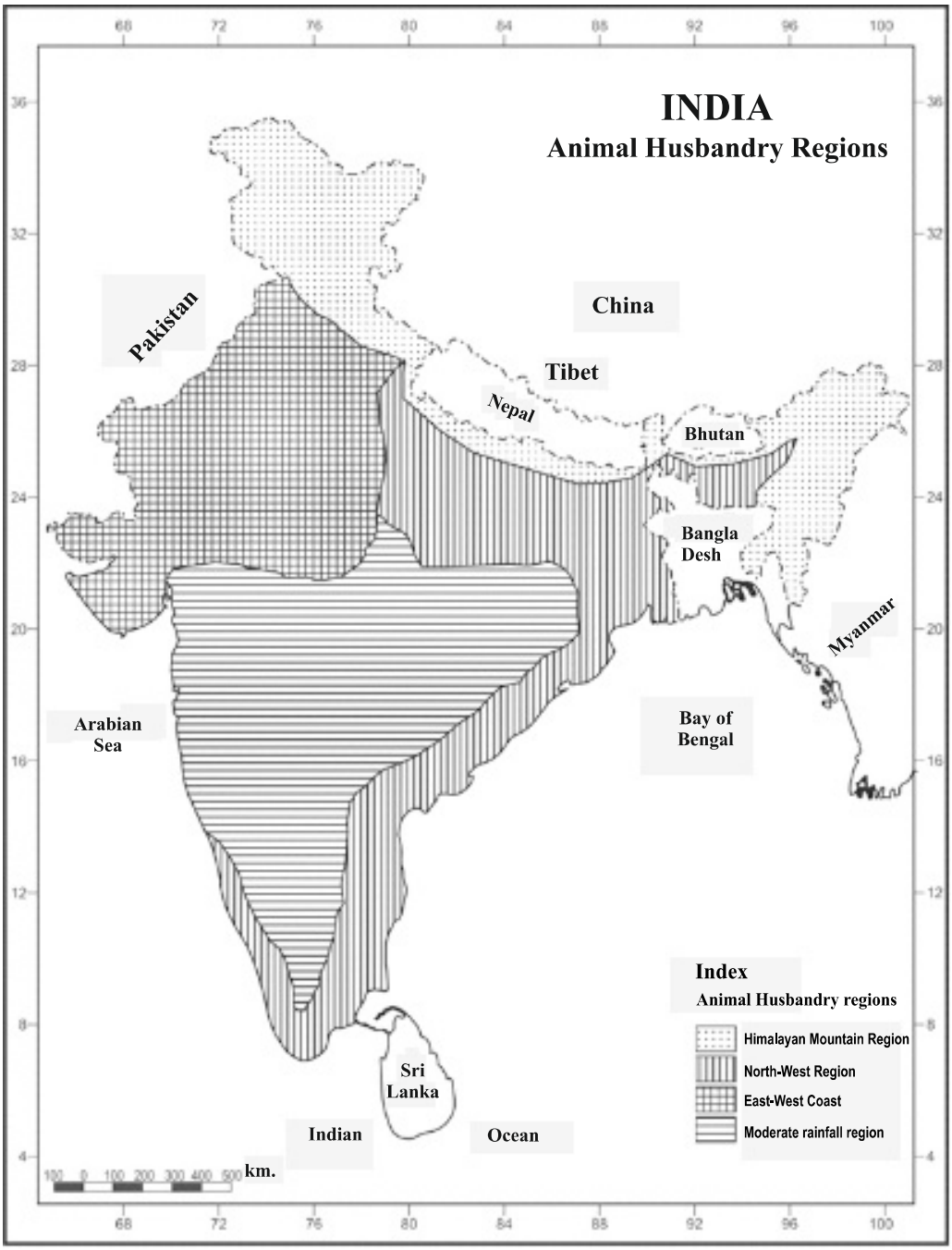
This region includes the southern U.P., Madhya Pradesh, Western Andhra Pradesh, Western part of Tamilnadu, Karnataka and eastern Maharashtra. Due to low rainfall - Jowar and Bajra are main crops of the region. This is main region for sheep rearing but wool received is of poor quality. Areas with tubewells and irrigation facilities rear good quality breeds of cows and buffaloes.

Main Domestic Animals

The numbers of domestic animals is continuously declining for many reasons in India,which was rich in animal wealth. The total number of domestic animals were 52.97 crore in 2007, which decreased to 51.21 crore in 2012.

(1) Cows- Bulls : Since ancient time man is rearing cows and bulls. These have holy place in men's life and society. They have their utilities in agriculture too. Scientific research has carified that the milk of Indian breed cows is one of the best and is of A2 group. India stands second after Brazil in cows- bulls rearing with 19.89 crore, which is 12.7% of the world. Cows-bulls are reared in all rerions. They are of many breeds**.** We obtain various healthy dairy products from cows. Cow's milk is compared to nactor because it is nutritious and has low fat content.

(2) Buffaloes : Buffalo gives more milk than cow, it is more nutritious and thick and have fat content. India stands first in buffaloes rearing, with 10.89 crores which is 56.7% of the world. Due to need of cooling water requirement, buffaloes are reared mostly in moist regions- U.P., Andhra Pradesh and Maharashtra, Punjab, Haryana, Rajasthan, M.P., Chhattisgarh, Bihar, Jharkhand and Tamilnadu also rear buffaloes. Main breeds of buffaloes are Murrah, Jaffrabadi, Bhadavari, Surati, Nilli, Mehsana and Desi.



Map 16.1 : India - Animal Husbandry Regions

(3) Goats : Goats are considered as the 'cow of poors' in India. These are reared for milk and meat. Goat gives 2-3 liters of milk daily. Need low maintenance cost. Goat's breed growth is very fast. Their waste is treated as best natural manure. India has more than 13.52 crore goats which is 14.5% of the world. U.P, Rajasthan, Punjab, Gujarat, MP, Karnataka, Tamilnadu, Andhra Pradesh and Jharkhand are main states. Goats are mainly reared for meat.

(4) Sheep : Sheeps are main source of livlihood in arid, semi arid and hilly areas. These are reared for wool and meat. Little quantity of milk is

also collected from sheeps. India stood second after China in sheep rearing. Around 6.51 crores sheeps are reared in India. Rajasthan consist 60% of India's sheep rearing. Rajasthan, Andhra Pradesh and Tamilnadu, Rest are reared in MP, Karnataka, HP, Punjab, Haryana, Uttarakhand and UP. Quality of wool of Indian sheeps is inferior, that's why it is called as carpet wool. Best quality wool is imported from Iran, Afghanistan,Central Asia, Nepal and Australia.

(5) Camel : The camel is a humpback mammal and have flashy pads and can walk and run in the desert easily. It eat leaves and bushes. The camel is the ideal domestic animal in desert with long, dry, hot periods of 8 month or more and scarce erratic annual rainfall between 500 and 550 mm. The hump is a collection of fats, which is useful in water deficiency. Camels can live for 7 to 8 days without water and carry heavy load for long distance of 50 km in 1 day. They even remember the route for long long time, camel is a symbol of human survival in the desert. That's why it is considered as the ship of desert.

Due to its domestic importance camels are used in platoons in army in border areas as beast of burden. The camel's meat, wool and leather are also widely utilized. It is also used in ploughing, water pulling and cart pulling. Milk is often the only regular food source for its owners. The number of camels are declining rapidly. Only 2.4% of total of the world is found in India(hardly around 4 lacs). 50% of total in India are found in Rajasthan, rest in Punjab, Haryana, Gujarat, UP and MP India have one humped camel whereas in Arab two humped camel are also found.

(6) Others : Horses, Mules, ponies, Donkey, Pigs, chickens and Yak are also important in livestocks.

Causes of poor conditions of livestock in India

In India 20% of worlds animals are reared and India has the first place in milk production in the world here 18% of world milk is produced. Here the animal produce less milk and meat mainly because of the following reasons -

(1) Lack of nutritious diet and green fodder

Food production is the main activity for meeting food demand of huge population. Animal husbandry is secondary occupation in India. Animals are provided with husk and dry fodder as there is a unavailability of green fodder due to lack of well managed and good pastures. Animals give less milk and meat due to shortage of suitable nutritious and sufficient fodder.

(2) Lack of best breed animal

Due to large number of weak animals Indian government is gradually expanding the artificial insemination center and veterinary clinics to improve the animal breeds. In rural areas, due to lack of centers, full facilities and the indifference of the rural farmer's, it did not get complete success.

(3) Diseases of Animals

Due to collective grazing and keeping in one yard, feeding rotten and littering things, unhealthy drinking water, many animals get infected by the diseases. Foot rot, Anthrax, Black Quarter, foot and mouth render pests, mastitis etc are common diseases of animals in rainy season which causes death of animals.

(4) Ignorance and Negligence of Cattle keepers

Traditional husbandry such as- tied at common shed, common group grazing, provided non-measures for cold and hot, non nutritional fodder turbid drinking water leads to low milk production. Also in the absence of green fodder for dairy animals, feeding dry stalks of crops results in less milk production. Now-a-days systemic scientific methods are used for animal husbandry which results in good health and good production of milk and meat.

Measures for Development of Animal Resources in India

Compared to the world's largest animals in India, (20%) are comparatively less productive in terms of milk and meat. Therefore, following

measures should be taken to achieve results in animal resources development in India.

1. Best pastures to be developed for providing complete and nutritious food for animals. With the help of irrigation, green fodder can be made available for the whole year. Government should provide animal fodder at cheaper rate.
2. Most of the of Population in India (69%) lives in rural areas. So every planning need to reach the inner core of villages. So the veterinary hospitals and artificial insemination centre need to improve the breeds necessarily in rural areas.
3. Sick animals cannot be taken far for veterinary treatment, So the veterinary hospitals should be opened at every Gram Panchayat level. These hospitals / clinics should provide treatment, artificial insemination and veterinary vaccines and diseases medicines.
4. Scientific animal husbandry methods and techniques should be used from village to village, for production of more milk and wool from less animals. In this way animal husbandry can be made beneficial by earning more income from less labour.

Forest Resources

Forest is an important resource among all natural resources. From ancient time, man depends on forests. They are regarded as god in India. Plantation is a holy works that's why Neem and blackberry were planted in houses.

According to forest policy declared in 1952, forests should cover 33% of the total land of the country. After attaining independence, due to indiscriminate cutting of forests, forests couldn't develop which resulted in decrease in forest area to 19.24% in 2001. With government efforts & public awakening, the forest ratio raise to 21.34 in 2015 (7,01,673 Sq. Km).

Reasons for deforestation

The following are the reasons for deforestation in India :-

1. Continuous increase in demand for agricultural land

The population of country was 63.33 crore in 1981, 102.7 crore in 2001 and 121.01 crore in 2011. The need of more grain production was experienced with rapidly increasing population. This has resulted in indiscriminate cutting of forests for the expansion of agriculture, due to this, forest area is continuously decreasing.

2. Rapid industrialization and urbanization

After independence India made rapid growth in industrialization and urbanization. Construction of industrial units, Residential colonies, business centres, offices, institutes, highways. streets and entertainment zones lead to large scale cutting of forests

3. Local Needs and Demands

Local needs such as in railway boggies, slippers, ships, furniture, building construction and for fuel also lead to decrease in the forests rapidly.

4. Uncontrolled grazing

Animals eat the lower parts of trees due to scarcity of natural green fodder. In search of green pasture, The stems of trees are cut down by animal rearer and important plants crashed and grazed by animals leads to the decrease of forests.

5. Shifting cultivation

Tribes as Nagas "Jhuming" Bhils "Dahdiya" practices agriculture as shifting agriculture. They leave farm land for 3-4 years and then began to shift to new place. This sort of practice also lead to deforestation.

6. Other Reasons

Development of Giant multipurpose irrigation projects, disregard of government rules, population

growth in urban areas, abuse of power, increasing mining areas, disease and insects in plants, fires in forests are the other main reasons for deforestation.

Distribution

Due to vastness of India variations in climate, relief and soil is found. So different types of forest are found in the country. These are as follows-

(1) Tropical evergreen forests

They are generally found in area with annual rainfall of 200 cms and above and temperatures around 28^0C. These forests remain green throughout the year. Three main regions of this forests are-

(A) The North-Eastern regions of India includes- Tarai region of Himalayas, parts of Assam, Meghalaya, Tripura, Nagaland, Mizoram and Southern parts of Arunachal Pradesh.

(B) Westren slopes of The Western Ghats - From Maharashtra to Kerala.

(C) Andaman & Nicobar Islands.

Ample rain and high temperature help to grow such forests. The wood of these forests are hard and blackish in colour. Average height is commonly 40 to 60 metres. Exploitation of these forests is very difficult and expensive as these forests are dense due to swamps and many climbers, bushes and small plants between trees and inaccesibility of sunlight.

Main Trees : Ironwood, Mahagony, Ebony, Rosewood, Coconut, Rubber, Bamboo, Sal, Wild Mango, Gurjan, Tulsar, Bet, Chaplas and different types of creepers are found.

(2) Deciduous or Monsoon forests

These forests are found in the areas having 100 to 200 cms of annual rainfall and average annual temperature ranges between 26˚ C to 30˚ C. Once in the year during summer season, the trees shed their leaves, that's why these are called deciduous forests. Average height of trees is are between 20 to 45 meters. Grasses grow in between due to less density of trees. Means of transport can easily be developed in these forests regions, as wood of these forest trees are not so hard. These forest resources are of high importance as their exploitation is easy. There are four major regions :-

(A) Outer & lower Himalayan slopes:- Himachal Pradesh, Uttrakhand, U.P., Bihar, West Bengal, Assam

(B) Central India :- M.P., Chhattisgarh, Jharkhand, Odisha.

(C) Eastern Shields of Western Ghats :- Maharasthra, Moist Plateau part of Karnataka, dry eastern parts of Kerala to Cape Comorin.

(D) Southern parts of Easter Ghats :- Andhra Pradesh, Tamilnadu.

Main Trees : Sagwan, Sal, Sheesham, Sandalwood, Rosewood, Bamboo, Khair, Kusum, Arjun, Ebony, Semal, Mulberry, Mango, Blackberry, Mahuva, Peepal, Amla, Harad, Behada, Palash etc.

(3) Tropical Forest

These forests are found in the areas of 50-100 cms annual average rainfall and 20˚ C to 35˚ C of annual average temperature. Mainly formed in two regions

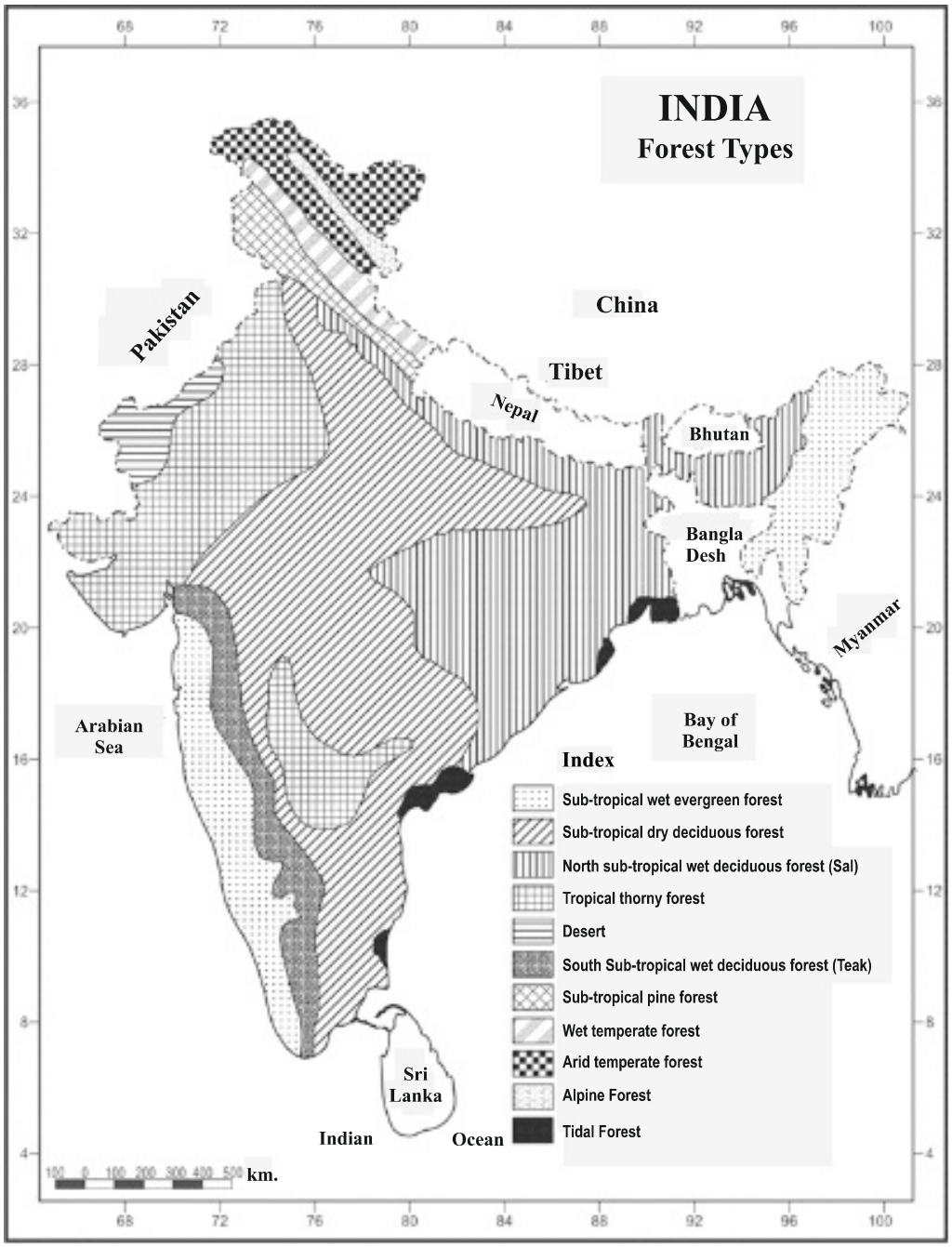
(A) North-Western India : S.W. Punjab, Haryana, Eastern parts of Rajasthan & Aravali mountains, S.W. Uttar Pradesh.

(B) Dry parts of Southern Peninsula : Trees of these forests have deep roots, thick leaves and straw coat. With the deficiency of rainfall the height of trees remain between 6 to 9 meters.

Main Trees : Babool, Khejdi, Mango, Blackberry, Neem, Mahuva, Banyan, Amla, Reetha, and kikar etc. Local utilities are more important of these forests.

(4) Desert Forests

These forests are found in the areas having less than 50 cms annual rainfall and 25˚ C to 35˚ C average annual temperature. It constitutes the forests areas of S.W. Punjab, Western Rajasthan, low rainfall areas of Gujarat and M.P. In these forests the roots of trees are long andk thick so that in



Map 16.2 : India - Forest Types

dry weather the trees get water from deep inside the earth. Leaves are small-thick and with thorns and stem is rough to minimize waterloss through evapotranspiration. These trees are less in number than bushes. Distance between trees is more and they are less in number. Date trees have good height than other trees.

Main Trees : Nagfani, Khair, Ker, Khejdi, Datepalm, Babool, Neem, Peepal, Banyan, Rambans, Cactus etc.

(5) Sub-tropical Evergreen or Mountainous Forests

These are mainly found in Eastern and Western

Himalayan, hills of Assam, Panchmarhi of M.P. and hilly parts of Mahabaleshwar of Maharashtra. The leaves of these trees are dense and evergreen and trunk is thick of these trees. Climbers and dense bushes are around these trees. Height of trees is between 15 to 18 meters. The wood is soft used as pulp for paper, packing. ply and plywood.

Main Trees : Pine, Sanovar, Deodar, Fur, Spruce, larch, Burch, Maple, Alms, and Chestnut. Higher areas have Ugenia, Micholia, Roddedron etc. trees are found. They remain evergreen throughout the year.

(6) Tidal or swampy forest

Tidal forest are found around swampy river beds such asdeltaic parts of Hugli, Ganga-Brahamaputra, deltaic part-of Hugli-Krishna, Cauvery, Mahanadi & Godavari. Coastal areas of sea with tides fill the salty water in the roots of trees, which is spread all around. Trees are high and green with soft wood.

Main Trees : Sundari trees in the deltas of Ganges-Brahmaputra and Mangrove trees in Hugli river delta are found in abundance.

Other Trees : Bamboo, Taj, Bent, Tad, Coconut, Roosifora, Senorita, Herotenia & Phoenix etc.

Main Products from forests

Varieties of products are received from Indian forests, some of them are rarest in the world, which make them more important such as sandalwood, Tendu leave (bidi Patta), Sakhu, Veledona, sarpagandha etc. Forest products can be mainly divided into two categories :-

(i) **Major Products :** Wood is main products of forests. Deodar, Pine, Mapel, Fur, Sprurce, White sanover, Sal, Sagwan, Sheesham, Mahuva, Sandal wood, Semae, Haldu, Arjun, Mango, Kher, Babool, Bamboo, Neem. etc. are main woods.

(ii) **Minor Products :** Various sorts of minor products are received such as Lac, Katha, Gum, Mahuva, Tung, Cane, Rubber, fruits, Honey, herbs, Medicines, dyeing colours for leather, Turpentine Oil, Natural silk, threads and many more useful products.

Importance of Forest Resources :

Forests is the mother of civilizations. Wherever forest development ends, it gives birth to deserts. Forest resources nurture directly and indirectly by providing food and shelter to the living organism through various, forms and system. The importance of forests is written that **"forests are national property".** Modern civilisation desperately need forests. The importance of forest resources in India can be easily understood by the benefits they provide.

Direct Benefits of forests

1. 2% of national income is received from forest resources.
2. Lacs of people get employment through forests and its products
3. 250 million tribal population are living in forests. Forests are a prime source of their livelihood.
4. Forests provide pasture to 55 million animals.
5. Woods of forest are used in construction, furniture, agriculture equipments, Boggies of Railways, Ships, Vehicles & for fuel. Sal, Sagwan, shesham, Deodar, Babool, Pine are main timber wood.
6. Raw materials for many industries such as paper, matchbox, silk, furniture, plywood, packing, Rubber, colours, toys are received from forests.
7. Varieties of fruits, flower, Katha, Turpentine Oil, Gum, Cane and dyeing materials for leather etc. are provided by forests.
8. Important Ayurvedic products such as Harad, Behade & Amla are received from forests.
9. Forests provide food and shelter for animals. About 500 types of animals/organisms are

found in forests of India. That's why they are called as paradise of Entertainment.

Indirect Benefits of Forests

1. Forests make air moist through evapotranspiration and helps in the precipitation
2. They maintain climatic balance and help in precipitation.
3. Forests help water to flow slow, Which results in decreasing soil erosion and flood.
4. By obstructing the path of winds, forests minimize the speed of storms and also prevent expansion of deserts.
5. They raise the water table of groundwater.
6. Coal is formed with the suppressed forests over long period.
7. Leaves of trees give humus and organisms which increase the fertility of soils.
8. Forests are symbol of Biological balance, beauty and good health.
9. They reduce air and noise pollution as forests use carbon dioxide as food and release oxygen.
10. Green house effects are controlled by forests.

Effects of deforestation

1. Deforestation reduces the amount of rainfall and make climate dry.
2. Deforestation lead to closing of forest based industries which leads to unemployment of population which leads to decrease in national income.
3. Deforestation helps the streams to flow faster and increase the risk of flood and soil erosion.
4. Level of underground water decrease with deforestation.
5. Intensity of storms and cyclones becomes higher, which results in the expansion of deserts.
6. Deforestation reduces the availability of timber wood for necessary construction and fuels.
7. Level of carbon dioxide will increase which will raise the temperance of earth.
8. With deforestation air pollution will rise creating health problems like tension, high blood pressure, itching, Allergies. fatigue etc which reduces the working capacity of man.
9. Deforestation will create ecological imbalance
10. Species of animal organisms will be in danger due to deforestation.

Conservation of forests

Forests have been always important in Indian culture. All caste groups have traditionally reckoned different trees as their diety, so that no one harms the trees. Trees are regarded as abode for God.

Indian culture and heritage very well knows the importance of conservation of forests, that's why they worship the trees like peepal , Ashok, Banyan and Neem etc. In ancient times, the entire country covered with "Tapovan" in which they used to meditate and contemplate the ascetic worship. During Mahabharat age the forests region like- Nemisharannya, Ashok, Panchvati, Nandan-Kanan, Dandkaranya etc. have their significance till today. Even Ashoka is considers as national tree. Trees as mentioned specifically in Agni Puran' "one tree equal to ten sons." With the Increasing human and animal population, industrialization & urbanization have adverse impact on natural vegetation. Therefore conservation and management of forest resources is must. India has 21.34% area under of forests. (Diagram 16.1)

Diagram 16.1 : India - Forest Area (2013)

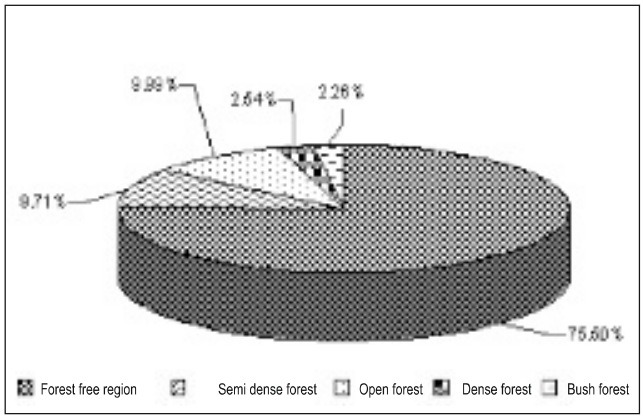


Diagram reveals the need and importance of forests conservation. All living organisms depend directly and indirectly on vegetation. Man itself is a consumer. The importance of forests becomes evident by benefits from forests given in this chapter, So the conservation of forests resources is absolutely essential. In India-conservation and development of forest with save girl child is exemplary.

- A small village Dharhra, 5 Kms away from district headquarter Bhagalpur (Bihar) represent a unique example of conservation of trees and daughter. They all put a unique illustration for saving tree and daughter. Chief Minister of the state also joins the campaign. The villagers plant a tree with the birth of every daughter. Everyone with the birth of a daughter, plant a tree in his land as per their capacity, this number can be from 1 to 50. If the land is not available to the family. They can plant at "Thakurrvadi" Everyone take full care of tress till their maturity.
- Amrita Devi from Jodhpur Rajasthan saved trees at the cost of her life. There is no other bigger example of conservation of forests than this in the world.

Fisheries

With the availability of rivers, canals, lakes, dams, ponds, reservoirs, seas and oceans and suitable climatic conditions combinedly favours the development of fishery resources. About 1800 species of fishes are found in India. Some of them are caught at commercial level.

Fishes are caught at only 25% of area out of total capable fields in India. Out of this, 60% is from oceans and 40% is from internal reservoir are caught. 70% of all fishes from the oceans are caught from the western coast and 30% from east coast. With increased exports and local consumption demand of fishes, this sector is also adopting scientific methods like dairy and poultry in India.

Importance of Fisheries Industry in India

Fisheries are very important in agro based Indian Economy-

1. Having a protein rich diet in the fish, it protects us from malnutrition by making the diet balanced.
2. About 11.4 million people are employed in fisheries which increases the national income and raise the standard of living .
3. Foreign exchange is obtained from exports of fish, which is helpful in balance of trade.
4. About 1.50 lakhs boats and 8 lakhs families are indulged in fisheries.
5. Fisheries develop subsidiary business like making boats, fishing nets, tools, ropes, drying of caught fishes, tin packing, oil, manure, fish godowns etc.

Favourable Conditions for fisheries

1. Shallow Seas : Shallow sea shores upto 100 fathom (600 feet) are very suitable because sun rays easily reach there, which is helpful for growth of fishes. Ample plankton and algae is available in shallow seas which is main food of fishes, also suits to lay eggs in such conditions.

2. Rivers mouths regions : Here the plankton and the essential ingredients of food are found in sufficient quantity, hence the plankton are found in excess at the mouth of the rivers. Various things are carried by rivers which are food for fishes.

3. Meeting places of warm and cold current are main areas of fisheries : Places of confluence of warm and cold ocean currents are main spots to catch fishes. Fishes can't tolerate the place where ocean currents of to different temperatures meet and collect at surface. Another suitable condition is available for plankton, which is main food of fishes in such region.

Majors regions of Fisheries

(1) Marine fisheries region : This regions includes the area from coast to 100 kms in the open seas oceans, out of it upto 40 kms majority of fishes are caught. Main types of fishes are - Shark, Mackerel, Akanki, Oal, Sardine, Pompheret,

Map 16.3 : India - Major Fishries Centres

catfish, tuna, eal, herring, jhinga, parnt, mullet, bombay buk etc.

(2) Rivers mouths regions : Mouths of Ganges, Brahmaputra, Hugli, Mahanadi, Godavari, Krishna, Cauvery, Narmada and Tapti, where upto 6 to 9 months, fishes are caught. Main are- Perch, UP, Corck, Katla, catfish, Rohu, hilla, pompheret, pearl spot etc.

(3) Fresh Water Regions : Such are found in lakes, ponds dams, rivers, reserviours, and canals etc. Ganges, Brahmaputra, Damodar, Mahanadi, Narmada, Tapi, Krishna and Cauvery are the rivers and their tributaries in which fishing is practiced.

(4) Pearl fishery regions : Oysters fishes are found in Gulf of Kutch, Saurashtra coast, Gulf of Mannar and Tamilnadu (Cape Comorin & Panban Island). Valuable pearls are found in the fishes of these regions. Special chemical injections is given to the fishes which turn into pearl in some time . Oyesters culture as a commercial pearl farming, is expanding with Japanese experts in Kutch and Saurashtra coast.

(5) Shell fisheries : In the swanpy and alluvial areas of the Indian beaches variety of shell fishes are caught during October to May in western coasts of Tamilnadu, Kerala, Gujarat and Saurashtra. Shells are used in temples & for decoration in houses.

Efforts for development of fisheries

(1) Special types of fisheries harbors are developing for catching fishes and increasing their production.

(2) Big steamers and Ships are being used for catching fishes.

(3) Cold storage and finishing drying units have been set up to protect caught fishes.

(4) Cold storage boggies in express goods trains in south India are being used for developing fisheries.

(5) Special training for fisherman at Cozen, Tutukundi (Tamilnadu), Satpari (Maharashtra), Kochi (Kerela), Vishaka-patnam, (AP) and Veraval (Gujarat) are being established.

(6) Research centres for search of new species of fishes at Mumbai, Barakpur (Kolkata), Mandpam (TN) by government of India are eastablished.

(7) With the help of Trailers, fisheries are seized by detecting in deep sea areas.

(8) Cooperative societies for selling fishes and aiding fishermen developed by government of Maharashtra, Karnataka, Kerala, Andhra Pradesh, Tamilnadu, Odisha, Gujarat and Punjab. These societies are given subsidies.

Fishing Ports

Government of India has setup fishing ports and harbours on the sea coasts for the development of fisheries. Here collection of fishes, sorting and freezing, export, warning for storms, anchoring for ships etc. facilities are available for fishermen. On eastern coast-Kolkatta, Cuttak, Puri, Gopalpura, Ganjam, Kalingpattanam, Veemlipattanam, Kakinada, Muchlipattanam, Nellore, Chennai, Pondicherry, Nagpattanam,Tuticos are the mainports and harbours. On Western coast, Porbander, Manglore, Surat, Mahim, Mumbai, Jaigarh, Ratnagiri, Malwan, Tellicheri, Kozhikode, Cochin, Aleppey, Thiruvanantpuram etc. are the main ports and harbours.

Production and Business

Production of fish and oceanic products is regularly increasing in India. In fish production India stood 2nd after China with 570 lac tons in 2012-13 but it is low compared to the availability of present water resources. Highest oceanic fish is produced by Andhra Pradesh with 18.08 lakh tons, West Bengal - 14.09 lakh tons, Gujarat - 7.86 lakh tons, Kerala - 6.33 lakh tons, Tamilnadu - 6.20 lakh tons, Maharashtra - 5.79 lakh tons, Karnataka - 5.75 lakh tons, Odisha - 4.10 lakh tons, India in 2001-02 fish production was 59.60 lakh tonnes, in 2012-13 produced 90.4 lakh tons and in 2013-14 - 95.80 lakh tons.

Water Resources

Our earth is called 'a blue planet', since nearly 71% of its surface is surrounded by water, water is synonymous with life. It is used in drinking, daily activities in construction works, irrigation, industries and transportation. It is must, limited and very sensitive resource. None of the work of man or environment can get completed without water. It has no alternate indeed.

Water resource is counted second after oxygen for giving support to human life. It is invaluable gift of nature, life is not possible without water. Rain is the only source of water, which is found in form of surface and underground water. South West monsoon in India is the prime source, which rains for 3-4 months i.e. from June to September. Another source North-East monsoon which mainly rains in Tamilnadu and Andhra Pradesh. Amount, distribution, and duration of rain is not certain so rainfall is uncertain every year.

Availability of Water Resources in India

Water is cyclic resource which is available in abundance on earth. 71% part of earth is constituted with water which is saline in nature. Only 3% of total available water is non-salty, out of this very low part is available use for human. Place and periods of availability of non-saline water vary from place to place. In India 4% water resources are available on 2.45% of the total land of the world. India has 17.5% of total human resources of the world. Due to India's vastness and physiographic variations, the availability of water varies significantly.

There are two main sources of water in India :- (1) Surface Water (2) Underground Water.

(1) Surface Water

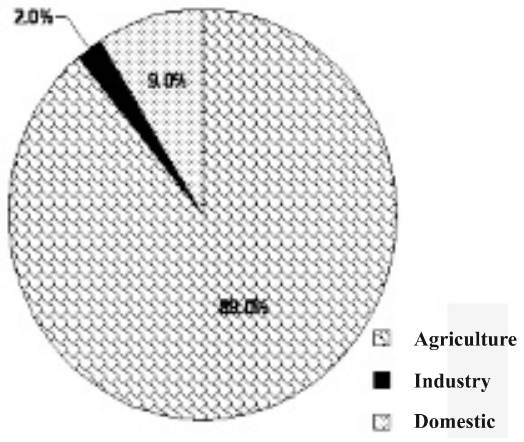
(A) Rainfall : Rainfall is the main source of

Map 16.4 : India - River basin

water. On 32.87 lakh square kms of land. India receives 108 cms of rainfall annually, precipitation provides 4000 cubic kms water in India, out of it 1869 cubic kms water is received by rivers, lakes, ponds, dams and other parallel sources and 1341 cubic kms is used in evaporation and moisture of soils. This moisture is used in agriculture in unirrigated regions. Rest 790 cubic kms is absorb by land, which is found in between pores of rocks known as artisian wells.

(B) Surface Water : On the earth's surface, rain water occurs as streams, lakes, ponds, dams and nallas.It is called surface water. In India, main source of water is rivers. India recieves 1869 cubic kms of water through rivers, lakes, ponds, dams and nallas resources. Due to variations into nature of slopes and soils and climatic conditions all water is not available for irrigation. Only 690 cubic kms of

Diagram 16.2 : India : Utilization of Surface water



river water can be used for irrigation. Out of it only 60% of water can be used due to lack of means to utilize it. Out of total water received from rivers 60% of it is obtained from the Himalayan rivers like Indus, Ganges, Brahmaputra, 16% by central India's rivers like Narmada, Tapti, Mahanadi and rest 24% share by south Indian rivers- Godavari, Krishna and Cauvery. Table 16.1 shows the ten major rivers of India, their length and expansion of their drainage area.

Table 16.1 : Major Rivers of India

S. No.	Name of River	Length (km)	Drainage Area (sq km)
1	Ganges (Longest river of India)	2525	100,062 861452 in India
2	Yamuna	1376	366,223
3	Brahmaputra	2880	580,080 194,413 in India
4	Indus	2900 1134 in India	11,65,000 453,000 in India
5	Narmada	1313	98,796
6	Tapi	724	65,145
7	Mahanadi	851	141,589
8	Godavari	1465	312,812
9	Krishna	1400	258,948
10	Cauvery	800	81,155

Source : India water resource information system

Uses of Surface Water

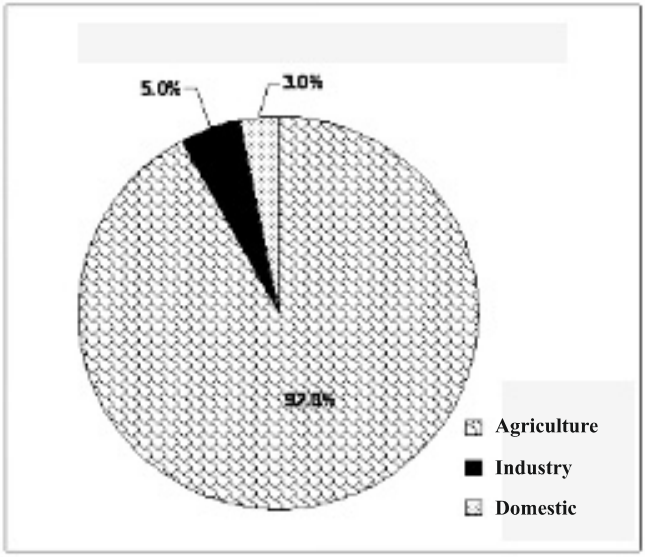
89% of surface water is used in agriculture,9% in domestic and 2% is used in industries. It is obtained from rivers, lakes, ponds and canals. The salty water of lagoons of Kerala, Odisha, West Bengal are used for fishery development and irrigating coconut and rice fields.

(2) Underground Water Resource

790 cubic kms out of total 4000 cubic km is in form of underground water. Out of it 430 cubic kms water reach on surface.

It is directly used in agriculture. Remaining 360 cubic kms water is accumulated below the surface in aquifers into the regions of permeable rocks such as sandstones, shale, gravel and even clay. This water is pulled out through drilling, tubewells, wells and "bavadi".

Diagram 16.3 : Utilization of Underground water



225 cubic kms water out of 790 cubic km underground water can be economically used. For irrigation only 78 cubic km of water is used as a water resource. Underground water is generally found in igneous and metamorphic rocks, that's why availability of underground water varies from region to region. In India, Tamilnadu, Andhra Pradesh, S.E. Madhya Pradesh, Karnataka, Jharkhand, Chhota Nagpur Plateaus and Hazaribagh

regions, Jhansi, Banda and Hamirpur districts of UP and in eastern parts of Rajasthan reservoirs of underground water is found. Tubewells, Wells, Bavadi are mostly found in such regions.

In the basins of Sutlej, Ganges, Brahmaputra 44% of underground water is found in permeable rocks, that's why plenty of wells and tubewells are found in Punjab, Haryana, U.P., Bihar and West Bengal.

Use of Underground Water

92% of its part is used in agriculture, 3% in domestic and 5% is used in industries.

Irrigation and Means of Irrigation

Due to scarcity of rain and long dry weather, water is supplied artificially in farm is called irrigation, and the means which are used in supplying water are called as the means of irrigation. Such as rivers, canals, lakes, ponds, well, tube wells etc. Tools and instruments which are used for dragging or pulling water such as Diesel pump. Electric pump "Rehat", "Chadas", "Dhekuli" etc are called as tools of irrigation.

Due to following reasons Irrigation is needed in India

- Need of more production due to continuous growth in population
- Uncertain and Unpredictable nature of rainfall
- Due to uneven and seasonal distribution of rainfall
- Intensive and multi crop farming type of agriculture need irrigation
- Some crops require more water
- To meet out the problem of drought.
- New and Hybrid seeds require more and timely water.
- For growth in production of commercial crops- irrigation is must
- Crops in dry regions require irrigation at proper time
- Nature of soils and for development of grazing pastures irrigation is needed.

History

From ancient times, irrigation is practised in India. In the Vedic Age canal was called as "Kulya" and "Avar" as wells. According to Megasthenes, Chandra Gupta's governor Pushpa Gupta made a lake Sudarshan with dam on a mountain river at Girnar (Gujarat). Later Ashoka the great, also made canals. On the same river, during Gupta Age, Chanakya mentions the use of irrigation in agriculture. He also highlighted the causes of floods in the absence of dams, which causes big losses to life and property.

On Cauvery River of India around 2 A.D. 300 m long, 12 to 18 m wide and 5 to 6 m high dam was constructed, which is among the oldest dams of the world.

Only 60% of land for agriculture is provided with irrigation facilities in India. Irrigation in done in northern parts with canals, wells and tubewells and southern parts with ponds and canals.

The classification of surface and underground water resources in India are as.

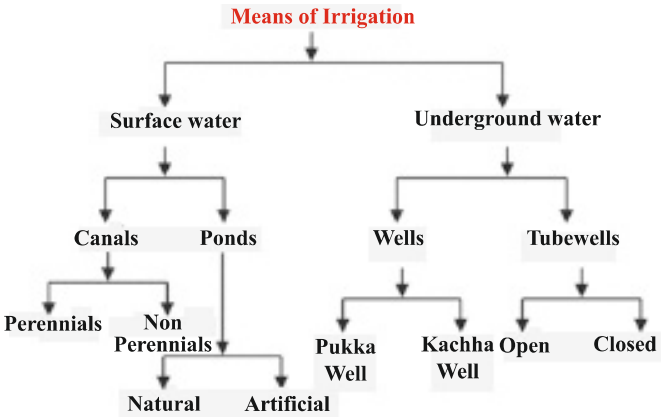


Chart 16.1 : Means of Irrigation

Water Problem

Continuous growth of population is reducing per person availability of water. Also water is

polluting by wastes of industries, agriculture and domestic uses. This is alarming situation for the availability of water.

Decrease in Water Availability

Water free of undesired substances is called pure water. Due to the presence of chemical substances and other wastes, toxic substances, micro organisms the water becomes useless for humans. It is called as water pollution or the quality of water deteriorate. With mixing of Chemicals, wastes, toxic substances, the waters of rivers, lakes, ponds and seas got polluted. It decreases the quality and natural cycle of water. Excessive pollution also pollute underground water too. The holy rivers Ganges and Yamuna are badly polluted.

Water conservation and Management

The need for conservation and management of this important life saving resource has become necessary for the continuous sustainable development of the increased demand of non-salty water and decreasing supply. Desalinization of oceanic water is costly process. Indian government should take effective steps to conserve water by making effective policies and legislation. So water saving, safety from pollution, storage of rain water, recycling, new techniques for irrigation, low water demanding crops and for long and collective use following ways can be useful

(1) Prevention of Water Pollution

The quality of water resources available on the earth is continuously decreasing fast. Use of organic pesticides and fertilizers in agricultural works, pollute water, so less use of chemical pesticides and fertilizers can prevent water from pollution. Filtration of polluted water, fruitful use of industrial wastes, advanced and sophisticated techniques also helps in preventing water from pollution.

(2) Recycling and reuse of water

This technique can improve the availability and quality non-saline water, low quality water can be used in cooling and fire fighting. In urban areas water used in bathing, washing utensils and cars can be reused in gardening. Pure water should be conserved for drinking.

(3) Water Management

It means the best use and management of water received from rainfall, surface and underground reservoirs. It also includes the extra flow of water, through dams, lakes, ponds and wells. It includes the conservation and proper use of every resources intelligently.

Central, state and non-government agencies are directing many programmes and policies for the conservation of water. "Haryali" water management by central government conserve water in rural areas for drinking, irrigation, Fisheries and forestry. "Akhari" in Alwar of Rajasthan water Parliament and "Neeru-Meeru" (Jal aur Aap) Programme in Andhra Pradesh villages helps to build dam, digging of ponds (Tal-Johad) for conserving water. Similar example of Tamil Nadu where no construction is permissible with out conserving water in the house.

Many water conserving projects helps environment and economy for changing life of people in the regions, so integrated combined water resources approach can certainly maintain the continuity supply of water for all.

(4) Rain Water Harvesting

Rain water Harvesting is a method of controlling and collecting rain water for various uses. It is used for recharging underground water source. In order to preserve each water drop, rain water is collected in tubewells, wells and pits. With increasing availability of water, ground water level is maintained.

Water harvesting reduces the salinity available in the water exchance its quality, reduces soil erosion and flooding. In rural areas orthodoxially water is stored in ponds, tanks, lakes, "Kunds", "Tal-Taliya". This is low cost based ecosystem. State government is harvesting water through "Jal Swavalamban" project to conserve and manage remarkably.

Mineral Resources

All natural products which are obtained by mining the land are called minerals. Such as Iron, Copper, Silver, Marble, Kota Stone, Coal, Petroleum etc. Scientifically, a mineral is an in organic material, having a definite composition. Some minerals, such as diamond or Carbon, are composed of one element, while most of the minerals are formed of two elements as Sulphur, Iron, have unique properties. Minerals have crystalline form, hardness, specific gravity, colour, lusture, transparency, streak, cleavage etc.

Minerals are highly valuable and important, free natural resources as a gift to man. Metallic minerals are used for manufacturing machines, Metallic and Non-Metallic mineral are used in construction of buildings and energy minerals are used for energy. So, minerals are the main pillars of Socio, economic, industrial and scientific development of any nation.

Indians were well known of minerals from the ancient time as Iron ages and copper age were the examples. After India's independence in 1947, 22 types of minerals were mined in India. Now it has reached upto 125 minerals. Out of these 125, 35 sort of minerals are very useful from economic point of view. Till today man has gained the knowledge of 1600 minerals, on the basis of dependency on minerals U.S.A. stand first, then India on second place and Russia on third place.

Distribution of Minerals in India

In India there are 6 main minerals Zones / Regions :-

(1) Jharkhand-Odisha West Bengal Zones/Regions : This region is streached to the NE Plateau region of Chhota Nagpur, Odisha plateau, parts of West Bengal and Chhattisgarh. It constitutes huge deposits of Iron-ore, Maganese, Mica, Copper, Elmenite, Bauxite, Chromite, phosphate and limestone.

(2) Madhya Pradesh Chhattisgarh-Andhra Pradesh-Maharashtra Region : Huge deposits of Iron-ore, Maganese, Bauxite, limestone, Mica, Copper, Granite and Diamond are found here.

(3) Karnataka Tamil Nadu Region : This region possesses deposits of Gold, Iron-ores, Manganese, Copper, Bauxite, Lignite, Coal, Lime stone, Gypsum, Chromite etc.

(4) Rajasthan-Gujarat Region : Deposits of Silver, Lead, Gypsum, Zinc, Mica, Manganese, Copper, Lignite, Coal, Emerald, Marble, Asbestos, Salt, Multani clay, Uranium, Beryllium, Petroleum, Natural gas.

(5) Kerala Region : This region have deposits of Monozite, Ilmenite, Garnet, Clay soil etc.

(6) Himalayan Region : Copper lead zinc, nickel, Cobalt, Tungsten, Gold, Silver, Chromite and Beryllium are the main deposits of the region.

Classification of Minerals

1. Metallic Minerals

(A) Ferrous Minerals : Iron, Manganese, Tungsten, Chromite, Nickel etc.

(B) Non Ferrous Minerals : Copper, Lead, Zinc, Silver, Gold, Bauxite, Ilmenite, Baryte, Magnesite, Aluminium, Tin etc.

2. Non Metallic Minerals :

Mica, Asbestos, Pyrites, Salt, Gypsum, Diamond, Stone, Rock Phosphate, Limestone, Dolomite, Glass soil and other useful soils.

3. Mineral fuel or Energy Resources :

Coal, Mineral oil, Atomic minerals as Uranium, Thorium, Ilmenite, Beryllium, Zircon, Antimony and Graphite etc.

Here metallic and non-metallic minerals are discussed-

1. Iron ore : Iron in the current era is the prime key for economic development of any nation. The modern age of machines is synonymous with iron. Iron is used in all machines and tools, equipments, instruments, automobiles, building structures, bridges etc. It is also synonymous with

industrialization. It is a direct index of the degree of industrial development. Iron-ores always contain impurities. In India iron ore of Black or Grey of Dharwar era is found in igneous rocks. Iron-ore is in impure form which is filtered through high temperature in turbines. This cooled and filtered iron is called wrought iron. Steel is prepared with the mixing of Manganese, Tungsten and Nickel.

Types of Iron Ore

The quantity of iron presence in ores are different it varies from 25 to 72% It is not beneficial for mining of iron ore with less than 25%. There are four types of iron-ore :-

(A) Magnetite : Magnetite (Fe_3o4) is the richest of the common iron minerals. It contains 72% of iron. The colour is darker blackish and brown, found in the igneous rocks. About 340.8 crore tons deposits are found in India.

(B) Hematite : Iron quantity ranges between 60 to 70% is by far (Fe2o3) the most important type. It is mostly reddish or ochre-red, also found in brown. Iron is found in solid or powder form. It got from Dharwad or Kuddapa group. About 10.05 billion ton deposits are estimated in India.

(C) Limonite : Or "brown ore" is the most common of the iron oxides. Its colour ranges from yellow to dark brown. Iron content is 30 to 60% in this type. It is a chemical compound in which water is present in varying amount. It is widely distributed over the earth and occurs in varying degress of hardness. It is found in sedimentary rocks.

(D) Siderite : Siderite ($FeCO_3$) consist of iron carbon and oxygen. It contains about 10 to 48% iron content. It is grey or light brown in colour. Although it contains less percentage of metal yet it is free from impurities that are difficult to eliminate in the smelting process, so its mining is not economically beneficiary.

Distribution of Iron-ores

(1) Karnataka : It ranks first in India with 24.08% of iron-ore production. Hematite type of iron-ore with 55-65% of iron content is produced, which has deposits of 1.45 billion tons. The main areas are-Kader (Hills of Baba-Badun), Bellari, Hospet, Shimoga, Dharwad, Tumkur, Chikmagalur, Chitradurga etc.

(2) Odisha : Odisha stood second with 22.13% of iron-ore production in India. Here also Hematite type of iron-ore 33 to 60% iron content is found here. The main contributors are Mayoorbhanj, Sambalpur and Cuttack districts.

(3) Chhattisgarh : It shares 19.97% of production and stood third in India. Here Hematite of iron ore is found which produce 50 to 60% of Iron from it. The main districts are Jabalpur, Rajgarh, Bilaspur, Sarguza etc.

(4) Goa : With the 18.05% of production, it stood fourth in India. The main districts are Mirna, Aadol Pale Onda, Kudnum, Prince Salem etc. After refining the iron is exported to Japan by Marmagoa port. The quality of iron-ore is not of good quality. Only 50% of iron is produced with this.

(5) Jharkhand : Produces 14.11% of iron-ores with 5th position in India. Main districts are Singhbhumi (Noamandi), Matrabhumi, Hazaribagh etc.

(6) Maharashtra : The lohar Pipalgaon of Devalgaon-Chandrapur district and Ratnagiri district are main producer.

(7) Andhra Pradesh : This state produces Magnetite type of Iron-ore with 65 to 72% of iron content. The main districts are Aadilabad, Karimnagar, Nizamabad, Krishna, Kurnool, Kuddappa, Guntoor, Nellore, Chittur, Warangal etc.

(8) Tamilnadu : Hematite type of iron ore with 65 to 70% of iron is produced mainly in the Salem, Trichirapalli, Arcot, Nilgiri, Dharmpuri etc.

(9) Other : Contributing states are Bihar, West Bengal, Jammu and Kashmir, Uttrakhand, Himachal Pradesh, Gujarat, Rajasthan, and Uttar Pradesh.

Production and Trade

India have largest reserves deposits of iron-

ore in Asia. Bulk of it constitute by Odisha, Karnataka and Goa. India's production in iron-ore is: - 2001-02 7.40 crore tons

2010-11 22.50 crore tons

2013-14 15.24 crore tons

In 2010-11 iron ore of Rs. 21,416 crore was exported by India. Marmagoa, Kolkata (Haldia), Vishakhapattam, Paradeep, Chennai, Manglore are the exporting ports. The export capacity of Marmagoa port is 80 lac tons. Japan alone imports almost 80% of the total export of iron ore by India.

Other iron-ore exporting countries in the world are Czech Republic, Germany, Romania, Italy, Poland, Serbia, Belgium, Hungary, South Korea etc.

Copper

With the development of human civilisation, copper's contribution has been significant for humans. Today it is used in wires, electronic instruments like Motors, Transformers, Generators, Pipes, Utensils and in many more things. Copper is used in its pure form as it is flexible and can be moulded in any form. It is mixed with gold for strengthening ornaments. Copper is mixed with many other metals such as with Aluminium, it makes brass, with Nickel it makes German Silver and with gold it makes Rolled Gold. 60% of copper is used in the electric production and its related industries. Copper is very low in quantity. So its substitute, Aluminium is getting importance in non-ferrous minerals. India also have low deposits of copper. Approx 71.25 crore tons. Out of it around 94 lakh ton copper metal is produced, which have ratio of metal 0.8 to 8% copper metal.

Main producing areas of copper in India are as under :-

(1) Madhya Pradesh : It stands first in copper production in India with 56.86% of share in production. Balaghat (MalJakhand) Taregaon, Betul are main producing districts, having 848 lakh ton deposits, which possesses 10.06 lakh ton pure copper.

(2) Rajasthan : It is second largest producer of copper in India. Jhunjhunu (Khetri and Singhana) is the main producing district. Here Hindustan Copper Corporation Khetri, smelts and filters copper. Total smelting, capacity is 40,000 ton annually. New deposits have been detected in Sikar, Udaipur, Banswara, Dausa, Bhilwara districts.

(3) Jharkhand : This state contributes 4.0 lakh tons of copper production. Here Singhbhumi Hazaribagh, Santhal, Pargana, Manbhumi etc. are main districts. 4% of total is produced. From 1924- with Indian copper cooperation . Copper sheets are made here.

(4) Others : Sikkim, A.P., Chhattisgarh, Gujarat, Karnataka, Odisha, U.P., W. Bengal, Manipur, Jammu & Kashmir etc. have deposits of copper in India.

Production and Trade

India import copper to meet its domestic demand from countries like U.S.A., Canada, Japan, Eastern Africa, and Zambia. Copper ore production in India is :-

1990-91 52.49 lakh tons

2004 -05 29.31 lakh tons

2009 -10 32.38 lakh tons.

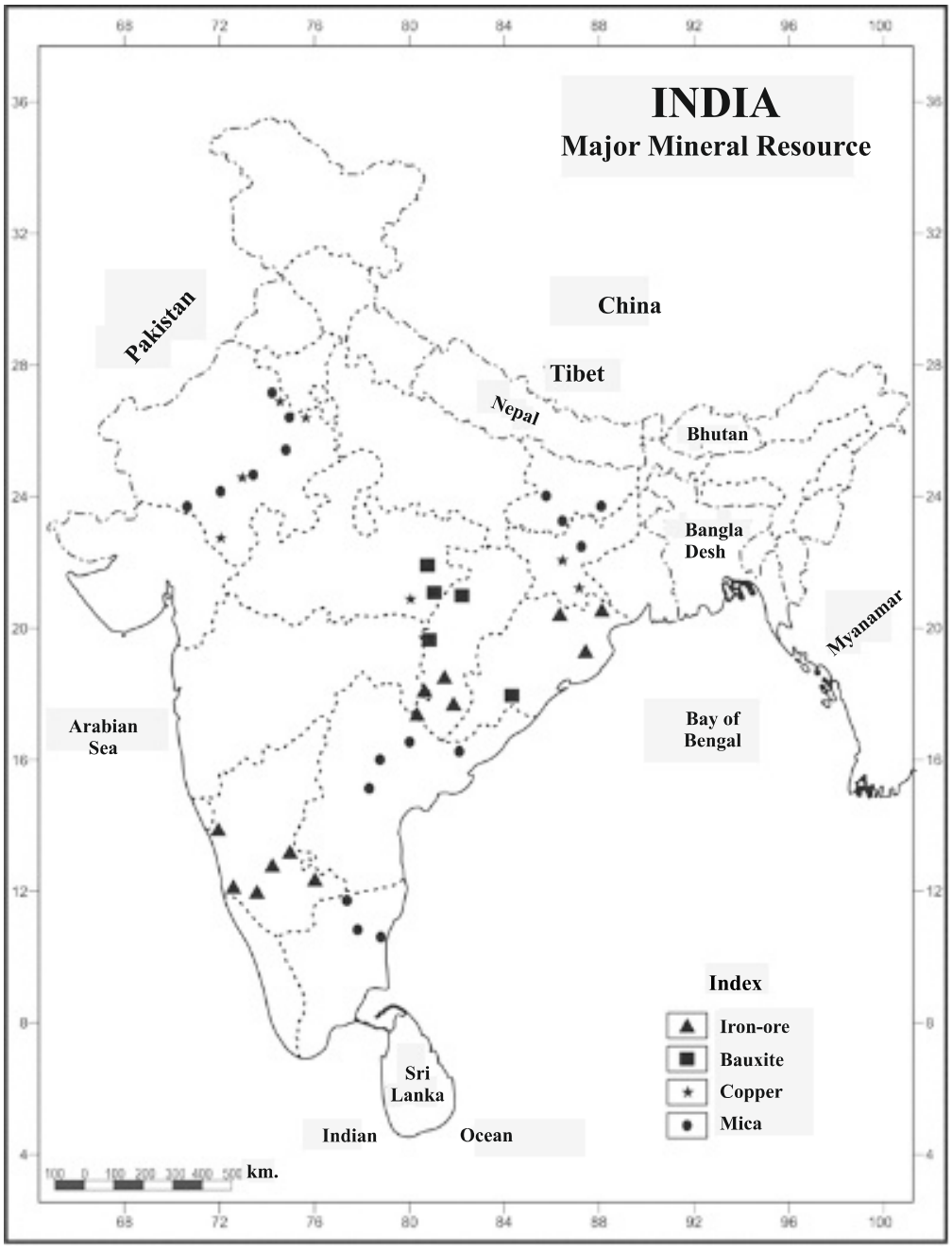
Aluminium

Bauxite is the important source of Aluminium. Bauxite is a bulky mineral of low value. It is desirable to remove its moisture by the Bayer process. The aluminium in alumina is separated from the electrolytic method. Bauxite contains 84% of Aluminium. It is light weight flexible, soft, ductile and best conductor of heat. It is rust free also.

Use : Aluinium is used in electric wires, Aeroplane, Missiles, Base of ships Sheets, contribution of structural metals for bridges and large buildings, tools, window and doors, utensils, refrigerators, air conditioners and other appliances.

Production Region

(1) Odisha : With 50.16% of Bauxite



Map 16.5 : India - Major Mineral Resource

production, (49.84 lakh tons) Odisha stands first in India. Kalahandi, Sambalpur are main leading districts. Here Ghandmadan plateau in Bolangir's Korapura districts leads in production. They constitute 64.5% of Aluminium in Bauxite.

(2) Gujarat : Haldar, Kheda, Sabarkanta, Surat, Jamnagar, Bhavnagar, Porbandar are the leading districts in production. There are near about 5 crore tons deposits, which contain 58 to 60% of Aluminium.

(3) Jharkhand : With 11.87% (11.61 lakh tons) production, it holds second position in bauxite production. Here Ranchi, Palamau, Girdih,Shahabad, Lohardaga etc. are major producing districts. Around 8 crore tons of fine deposits of bauxite lies here, which possesses metal from 50 to 63%.

(4) Maharashtra : Kolhapur, Colaba, Thane, Ratnagiri, Satara, Pune etc. are the major bauxite producing districts. About 8.05 crore tons deposits exist here. It stands fourth with 9.46 lakh tons of production.

(5) Chhattisgarh : With the production of 6.18% (6.40 lakh tons) Chhattisgarh stands fifth in India. Chhattisgarh possesses large quantity of deposits of bauxite ranging from 30 to 35 crore tons. Sarguja, Raigarh, Mahasamar, Korba, Rajnandgaon and Bilaspur are major bauxite producing districts with 62% of metal.

(6) Tamilnadu : With 274% (2.64 lakh tons) of production, it stands at 6th position. Salem, Madurai, Nilgiri and Coimbatore are major producting districts, with 45 to 60 % of metal.

(7) Madhya Pradesh : It holds seventh position in India with 2.35% (2.30 lakh ton). Shahdol, Mandla, Balaghat, Katni, Jabalpur, Seoni are major producing districts.

(8) Karnataka : Belgaon, Hills of Bababadun and Kanara districts are major contributors in production with 50 lakh tons of deposits.

(9) Andhra Pradesh : Telangana, Vishakhattanam, Vijanagar, Srikakulam etc. districts produce bauxite with 3.25 crore tons of deposits.

(10) Other States : Udhampur and Punch districts of Jammu and Kashmir and Goa are bauxite producing regions.

Production and Trade

About 62% of total production is received from Orissa and Jharkhand. In 1947 only two small Aluminium Smelters at (A) Alwaye (Kerala), (B) Asansol (West Bengal) with 7000 tons of production rise to 6.40 lakh tons. Due to establishment of new smelters, bauxite production in India was -

2005-06 123.65 lakh tons

2013-14 217 lakh tons

With the production of good quality alumina, India exports 15 to 20 lakh tons to European countries and Russia. About 80% of Aluminium is produced from bauxite.

Mica

Mica is found in igneous and metamorphic rocks in white, pink and green colours. These are found in veins of rocks with 3 cm to 1 meter long and wide patches. Mica is a transparent tough as well as flexible and resilient mineral. It is a non-conductor and therefore, makes it an ideal electrical insulator. It is used in the electrical industry and hardly it has a substitute. Non splitting Mica is usually used as a lustrous sprinkle as wallpaper, for roofing, lubrication, varnish, medicines, aeroplanes, telephone, radio, television, motors, wireless etc.

Major Producing Regions

(1) Andhra Pradesh : It stand first in production and constitutes 72.56% of total production of India. Viskhapattanam, Krishna, East and West Godavari, Khamman and Anantpur are the major districts. Green colour mica is produced here. Nellore's mica is world famous for its quality.

(2) Rajasthan : Rajasthan state stand second in production with 15.61% (190 tons). Bhilwara, Udaipur, Ajmer, Rajsamand, are the major Mica producing districts. Some little shares are by Tonk, Alwar, Bharatpur and Dungarpur. Light green and pink colour mica of supreme quality is produced in Rajasthan.

(3) Jharkhand and Bihar : Both states combinedly produce 11.83% (144 tons) and hold third place in production. Hazaribagh, Gaya, Kodrama, Bhagalpur, Munger, Santhal Pargana are major districts here. Light red colour best mica is extracted here, which is called as “Bengal Manik”. Some of Mica is also procured from Singhbhumi and Palamau districts.

(4) Tamilnadu : Tirunelvelli, Coimbatore, Trichurapalli and Madurai are major producing districts.

(5) Other States : It includes Nayyur, Punnaloor, Alleppey and Quilon in Kerala, Dhenkanal, Sambalpur, Koraput, Cuttack, Ganjam

in Odisha, Hassan & Mysore in Karnataka, Bastar in Chhattisgarh, Bakura and Midnapur in West Bengal and Gurgaon in Haryana produces mica.

Production and Trade

India holds the major portion of production with 80% share in the world's total mica production. Plastic is it's substitute in Electrical industry which has minimized the demand of mica. Production of mica :-

2003-04 1217 tons

2007-08 1300 tons

2013-14 1610 tons

IMPORTANT POINTS

1. In India, animal resources are used in vivid agricultural works and as means of transport.
2. Milk, Cheese, Milk Cake, Curd, Butter, Ghee, Buttermilk, etc. nutritious products with meat and wool are obtained from animals.
3. Leather and skin is obtained from animals. Manure is prepared from their dung, blood and bones.
4. India has 20% of the total animals of the world.
5. Lack of Nurtritious feed, lack of green fodder, animal diseases, lack of quality animals, ignorance and lack of knowledge of livestock farmers are responsible for the poor conditions of animals in India.
6. Forests constitute 2% in national income of India.
7. According to 1952 forest policy, 33% of land should be covered with forests. Even after good efforts only19.49% in 2001 and 21.34% in 2011 of India is covered with forests.
8. Increased demand for land for agriculture, rapid Industrialisation and urbanization, deforestation due to domestic requirement, uncontrolled grazing, shifting agriculture, extension of mining areas, growth of big and multipurpose project etc. are the factors responsible for reducing forests area in India.
9. There are various direct and indirect benefits of forests.
10. Wide variety of useful woods major and minor products as-lac, Katha (Catechu), Gum, grasses, dying items, fruits, Honey, wax, herbs, medicines, Mahuva, Bamboo, Cane etc. are received from forests.
11. Fisheries provide employment to 1.14 crores people of India.
12. Suitable conditions for growth of fishery are- shallow seas, river mouth ,meeting places of cold and hot currents, temperate climatic zones etc.
13. India's three main fishing regions are- coastal areas, river mouths and International fresh water regions.
14. 90% of rainfall occurs due to SW monsoon in summer season in India.
15. 4000 cubic kms of water is received from rainfall in India.
16. Average annual rainfall is 108 cms in India.
17. During dry season or scarcity of rainfall, the artificial way of providing water to the farms is known as irrigation.
18. The main sources of irrigation in India are- tube wells, canals, wells, ponds and dams.
19. All those natural substances which are dug out from land are known as mineral resources.
20. In India there are six main regions of minerals.
21. During 2014-15, India exported minerals worth Rs. 17.80 billions.
22. The total share of minerals is 9.4% of total exports.

EXERCISE

Multiple Choice Type Questions

1. India stand at which place in cattle rearing ?

(A) Second (B) First

(C) Third (D) Fourth

2. How much percentage of world's buffaloes rear in India?

(A) 40% (B) 56%

(C) 48% (D) 42%

3. Which state of India rear maximum camels?

(A) Gujarat (B) Punjab

(C) Haryana (D) Rajasthan

4. Percentage of geographical area under forests in India is-

(A) 22% (B) 21.05%

(C) 14% (D) 19%

5. Which state has the highest percentage of area under forests?

(A) Mizoram (B) Meghalaya

(C) Arunachal Pradesh (D) Himachal Pradesh

6. Forests found in areas having below50 cms of rainfall are called …….. forests

(A) Dry (B) Desert

(C) Monsoon (D) Evergreen

7. The type of vegetation found on western ghats is-

(A) Evergreen (B) Alpine

(C) Savanna (D) Deciduous

8. Tropical moist evergreen forests are found in

(A) Aravali Mountain (B) Shillong Plateau

(C) Peninsular Plateau (D) Shivalik Range

9. Oyster culture is developed at-

(A) Saurashtra Coast (B) Mumbai Coast

(C) Cochin Coast (D) Chennai Coast

10. Longest river of India is-

(A) Brahmaputra (B) Ganga

(C) Yamuna (D) Krishna

11. Which sector utilizes most of the surface water?

(A) Agriculture (B) Industries

(C) Domestic (D) Others

12. Neeru- Meeru program is related to

(A) Rajasthan (B) Andhra Pradesh

(C) Gujrat (D) Karnataka

13. Copper is produced in -

(A) Rajasthan and Bihar

(B) Uttar Pradesh & Rajasthan

(C) Bihar, UP & Rajasthan

(D) Orrisa, Rajasthan Bihar & UP

14. Which mineral is extracted from the hills of Bababadun, located in Karnataka ?

(A) Iron-ore (B) Manganese

(C) Nickle (D) Petroleum

15. Which state produces maximum mica in India?

(A) Andhra Pradesh (B) Bihar

(C) Jharkhand (D) Rajasthan

16. The Mica mining in India is done in -

(A) Khetri (B) Kodrama

(C) Kalahandi (D) Gurumahisani

17. Iron-ore of Baieladila is of which type ?

(A) Hematite (B) Siderite

(C) Limonite (D) Magnetite

18. Which state of India produces maximum iron-ore

(A) Goa (B) Chhattisgarh

(C) Odisha (D) Madhya Pradesh

19. BALCO is related to the production of-

(A) Aluminum (B) Gold

(C) Copper (D) Zinc

20. Leading state in copper production is-

(A) Jharkhand (B) Rajasthan

(C) Madhya Pradesh (D) Karnataka

21. Which of the following is the main mine of bauxite-

(A) Jawar (B) Khetri

(C) Lohardaga (D) Kalol

Very Short Answer Type Questions

22. What percentage of world's livestock is found in India?
23. Which animal is reared for wool and meat?
24. Name the most important timber of monsoon forests?
25. How many people are employed in fisheries in India?
26. Presently, how much part of India (in %) is covered by forests ?
27. Which are the major areas of fishing in India?
28. How much is the annual average rainfall in India?
29. What are the main sources of irrigation in India?
30. What is mineral ?

Short Answer Type Questions

31. Why is camel called ship of the desert ?
32. Write the names of main domestic animals found in India.
33. What is the importance of animal resources in India?
34. What are non-metalic minerals ?
35. Describe the main source of irrigation used in India.
36. Describe the copper production areas in India.

Essay Type Questions

37. Describe the causes of weakness of animals while describing the products received from animals in India
38. Describe the losses caused by forests destruction while mentioning the causes of deforested areas in India.
39. Describe the type of forests resources while explaning the importance of forests resources in India.
40. Write an essay on fishery resources in India.
41. Write an article on the availability and use of water resources in India.
42. What is the importance of iron in the modern age? Illustrate the distribution, production and trade of Iron in India?
43. Describe the utility of aluminum. Illustrate the distribution and trade of Bauxite in India.