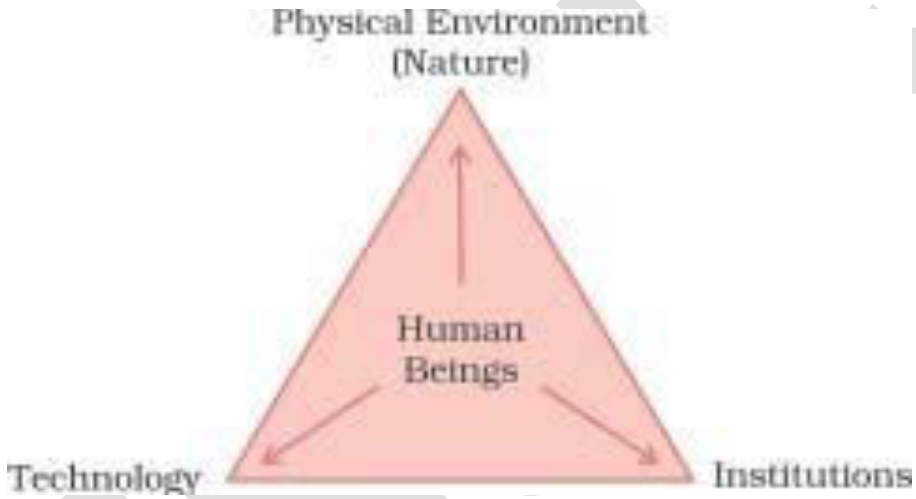
UNIT - 1

LESSON 1 – RESOURCES AND ITS DEVELOPMENT

Man on Earth is always dependent on nature and environment. He is satisfying his needs by using various natural resources directly or indirectly. As a result he developed his life style. It is observed that changes in nature and physical changes in the environment is taking place. Furniture from wood, loom from cotton, clothes from loom, minerals, and various technological instruments, accessories for building houses etc are the examples of its use of nature.

Everything available in our environment which can be used to satisfy our needs, provided it is technologically accessible, economically feasible and culturally acceptable can be termed as Resource. The process of transformation of things involves an inter-dependent relationship between nature, technology and create institutions to accelerate their economic development.



Interdependent relationship between nature, technology and institutions

Do you think that resources are free gifts of nature as is assumed by many? They are not. Resources are a function of human activities. Human beings themselves are essential components of resources. They transform material available in our environment into resources and use them. Hence man is treated as a resource called human resource. Life style of the people depends on its national resources and population. Hence nation's cultural and economical growth depends that country's population, natural resource and human resources and nature of utilization.

Resources has got two importance :

1. Resources should be accessible to all human beings.
2. It should be helpful to man to transform material available in our environment into resources.

Depending on origin, use, nature etc resources has been divided into following

1. **As per nature –**
    a. Resources which are natural (not manmade) which is helpful to man directly or indirectly are called natural resources. e.g Land, Soil, Forest, wild animals, water, air, minerals and different forms of energy

    b. Cultural Resources – with the development of civilization, man with the help of his ability and technical knowledge transformed the natural resources into as per their needs. Resources can contribute to development only when they are accompanied by appropriate technological development and institutional changes. Therefore, in India, development, in general, and resource development in particular does not only involve the availability of resources, but also the technology quality of human resources and the historical experiences of the people. Hence various humanistic, cultural and economical institutions like education, health, transport, business, income tax, money circulation and various political and social organization are part of the resources only.

    c. Human Resouces – man has been treated as an independent resource called human resource. Man along with his surrounding as well as social and cultural organization contribute to form Human Resources.

2. **On the basis of Origin-**
    a. Biotic – these are obtained from the biosphere and have life such as human beings, flora and fauna , fisheries, life stock etc
    b. Abiotic- all those things which are composed of non living things are called abiotic resources. For e.g rocks and metals
3. **On the basis of Utility –**
    a. Exhaustible – Resources which slowly finish/exhaust by its repeated use are called exhaustible resources. E.g. Petroleum, Coal, Minerals etc

    b. Inexhaustible – Resources which are plentily available in nature and are not likely to get exhausted even after repeated use. E.g. Solar Energy, Wind Energy, Hydro energy

4. **On the basis Quantity –**
    1. Irreplenishable – Resources which cannot be re-cycled or re-produced and will exhaust completely are called irreplenishable resource. E.g. mineral, oil, coal etc

    2. Replenishable – Resources which can be re-cycled or re-produced with time and are in exhaustible are called replenishable resources. E.g. Solar energy, wind energy, tidal energy etc.

5. **On the basis of Exhaustibility –**
    a. Renewable – The resources which can renewed or re-produced by physical, chemical or mechanical process are known as renewable resources. E.g. solar and wind energy, water, forest and wild animals.

    b. Non – renewable – These occur over a very long geological time. E.g. Mineral and fossil fuels. These take millions of years in their formation. Some of resources like metals are recyclable and some like fossil fuels cannot be recycled and can exhaust with their use.

6. **On the basis of distribution –**
    a. Ubiquitous – Resources which are available everywhere on the surface of the earth. E.g. land, water, air

    b. Localised Resources – the resource which are available at particular place and have a limited availability on earth's surface are called localized resources. E.g minerals

7. **On the basis of the Status of Development –**
    a. Potential Resources – Potential Resources are the resources which are found in a region, but have not been utilized. E.g Western parts of India particularly Rajasthan and Gujarat have enormous potential for the development of wind and solar energy but so these are not been developed properly.

    b. Developed Resources – Resources which are surveyed and their quality and quantity have been determined for utilized. The development of resources depends on technology and level of feasibility.

    c. Stock – materials in the environment which have the potential to satisfy human needs but human beings do not have the appropriate technology to access these are included among stock. E.g water is a compound of two inflammable gases i.e. hydrogen and oxygen which can be used as a rich source of energy. But we do not

have the required technical knowhow to use them for this purpose. Hence it can be considered as stock.

d. Reserves – these are the subset of the stock, which can be put into use with the help of existing technical knowhow but their use has not been started. These can be used for meeting future requirements. E.g. river water can be used for generating hydro electric power but presently, it is being utilized only to a limited extent. Thus the water in the dams, forest etc is a reserve which can be used in the future.

8. According to Ownership –

a. Individual resources – these are also privately owned by individuals. Many farmers own land which is allotted to them by government against the payment of revenue. In villages there are people with land ownership but there are many who are landless. Urban people own plots, houses and other property. Plantation, pasture lands, ponds, water in wells etc. are some of the examples of resources ownership by individuals. Make a list of resources owned by your household.

b. Community owned resources – there are resources which are accessible to all the members of the community. Village commons (grazing grounds, burial grounds, village ponds etc) public parks, picnic spots, playgrounds in urban areas are de facts accessible to all the people living there.

c. National resources – technically, all the resources belong to the nation. The country has legal powers to acquire even private property for public good. You might have seen roads, canals, railways being constructed on fields owned by some individuals. Urban development Authorities get empowered by the government to acquire land. All the minerals, water resources, forests, wildlife, land within the political boundaries and oceanic are up to 12 nautical miles (19.2 km) from the coast termed as territorial water and resources therein belong to the nation.

WORK FOR YOU - Prepare a list of stock and reserve, resources that you are familiar with from your local area.

d. International Resources – there are international institutions which regulate some resources. The oceanic resources beyond 200 nautical miles of the Exclusive Economic Zone belong to open ocean and no individual country can utilize these without the concurrence of international institutions like United Nation .

WORK FOR YOU – Make list of Individual, Community, National and Internal Resources.

DO YOU KNOW - India has got the right to mine manganese nodules from the bed of the Indian Ocean from that area which lies beyond the exclusive economic zone. Identify some other resources which are international in nature.

Development of Resources – Resources are vital for human survival as well as for maintaining the quality of life. It was believed that resources are free gifts of nature. As a result, human beings used them indiscriminately and this has led to the following major problems.

1. Depletion of resources for satisfying the greed of few individuals.
2. Accumulation of resources in few hands, which, in turn, divided the society into two segments i.e. haves and have nots or rich and poor.
3. Indiscriminate exploitation of resources has led to global ecological crises such as, global warming, ozone layer depletion, environmental pollution and land degradation.

An equitable distribution of resources has become essential for a sustained quality of life and global peace. If the present trend of resource depletion by a few individuals and countries continues, the future of our planet is in danger. Therefore, resource planning is essential for sustainable existence of all forms of life. Sustainable existence is a component of sustainable development.

Planning of Natural Resource – natural resources around us like air, water, land, soil, plants and animals etc always helpful to us. They provide us many things which are important for life. But man is not able to understand its contribution. Due to man's ignorance and lack of sufficient knowledge man is using these resources continuously without any fault. The demand of resources increasing with increase in population. Man is over-utilising these resources by implementing various technologies. In order to fulfill his needs, man is mis-utilising the natural resources continuously.

Resources are vital for any development activity. But irrational consumption and over-utilisation of resources my lead to social-economic and environments problems. To overcome these problems, resource conservation at various levels is important. Greedy and selfish individuals and exploitative nature of modern technology as the root cause for resource depletion at the global level. The prime important topic at present is proper utilization of natural resources and its conservation.

Planning is widely accepted strategy for judicious use of resources. It has importance in a country like India, which has enormous diversity in the availability of resources. There are regions which are rich in certain types of resources but are deficient in some other resources. There are some regions which can be considered self sufficient in terms of the availability of resources and there are some resions which have acute shortage of some vital resources. For example, the states of Jharkhand, Chhattisgarh and Madhya Pradesh are rich in minerals and coal deposits. Arunachal Pradesh has abundance of water resources but lacks in infrastructural development. The state of Rajasthan is very well endowed with solar and wind energy but lacks in water resources. The cold desert of Ladakha is relatively isolated from the rest of the country. It has very rich cultural heritage but is deficient in water, infrastructure and some vital minerals. This calls for balanced resource planning at the national, state, regional and local levels. Resources are vital for any developmental activity.

But irrational consumption and over–utilisation of resources may lead to socio-economic and environmental problems. Apart from these, plants and animals are also becoming extinct and some are being considered as an endangered animals. Due mismanagement of waste(smoke, garbage, chemical waste etc), air and water is getting polluted. Deforestation of forests are one of the reasons for all natural calamities and forest lands are transforming into deserts. Smoke from vehicles and industries polluting the air, waste from industries polluting the land and water. As a result, man is facing natural calamities like cyclones, floods, drought etc every year. With the increase in population, misuse of resources is also increasing. To overcome these problems resource conservation at various levels is important. For example Gandhiji was very apt in coicing his concern abou resource conservation in these words : “There is enough for everybody’s need and not forany body’s greed”. He placed the greedy and selfish individuals and explitative nature of modern technology as the root cause for resource depletion at the global level. He was against mass production and wanted to replace it with the production by the masses. Proper use of the natural resources will lead into no natural calamities neither any natural disaster can occur.

RESOURCE CONSERVATION – Rational utilization of resources and providing sufficient time to replenish the resources or for renewal process is known as resource conservation.

Sustainable development – sustainable economic development means development should take place without damaging the environment and development in the present should not compromise with the needs of the future generations.

The main objectives of resource conservation are as follows –

a. To protect the basic needs which we get from our environment and essential for life
b. Proper utilization of resource organizations and keeping intact of the immanent capacity of the resourceful organizations.
c. To protect various biodiversities

DO YOU KNOW?

Importance of resource development

1. To respect all living things of the earth and take care of them.
2. To bring development of the life style of the mankind.
3. To conserve capability and diversity of the earth.
4. To reduce the depletion of natural resources.
5. One should be inclined towards environment and bring changes in maintainence.
6. To bring awareness among people of various regions about how to take of care of the environment.

Resources can be conserved in 3 ways

1. To reduce the over-utilization of resource.
2. To follow different skill of recycling of resources.
3. Resource can be conserved by re-using it.

Resource conservation and planning in India

Resource planning is complex process which involves :

1. Estimation and measurement of the resources required besides identification and inventory of resources across the regions of the country.
2. Estimation of the inventory/stock of the existing resource and its further development Surveying, mapping and qualitative and quantitative estimation of the resources.
3. Planning of extraction of resources its valuation and utilization.
4. Evolving a planning structure endowed with appropriate technology, skill and institutional set up for implementing resource development plans
5. Planning of reuse of the resources and matching the resource development plans with overall National development plans.

Resource conservation and planning depends on availability of resources, its utilization and proper management. Transportation, communication and Marketing plays an important role here. Research planning for discovery new and alternative resources.

The main aim of planning resources is nothing but time management and its proper/judicious utilization, rational consumption of the resources. Resource planning is very much important and necessary of the country like India which has the enormous diversity in the availability of resources. There are regions which are rich in certain types of resources but are deficient in some other resources. There are some regions which can be considered self sufficient in terms of the availability of resources and there are some regions which have acute shortage of some vital resources. For example the states of Jharkhand, Chhatitisgarh, Madhya Pradesh and Odisha are rich in minerals and coal deposits. Arunachal Pradesh has abundance of water

resources but lacks in infrastructural development. The state of Rajasthan is very well endowed with solar and wind energy but lacks in water resources. The cold desert of Ladakh is relatively isolated from the rest of the country. It has very rich cultural heritage but it is deficient in water, infrastructure and some vital minerals. This calls for balanced resource planning at the national, state, regional and local levels.

Coal and mineral oil (crude oil like petroleum, diesel etc) may exhaust within this century due to continuous utilization of it. Therefore, different plans to be incorporated to encourage and provide opportunities of use alternative energy resources like solar energy, wind energy, biogas etc

The entire world is paying attention towards the rational utilization of natural resources like air, water, land, soil, forest etc and to make these resources pollution free. India, too is trying to implement new and various scientific methods, passing various legislation acts to control pollution.

India has made concerted efforts for achieving the goals of resource planning right from the First Five Year Plan launched after Independence. An international level committee is formed to protect nature and natural resources called INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES, IUCN. As a member of UN (United Nation), India is taking all initiatives to follow the rules and principles of framed by IUCN to conserve natural resources.

Through wild life conservation policy and planning, IUCN is taking all initiatives to protect the following 5 type of species

a. Extinct species
b. Endangered species
c. Vulnerable species
d. Rare species and
e. Insufficiently known species

Government is putting much effort on conservation of Bio-diversity in order to protect forests. To control deforestation, various forest protection bills have been passed.

Through conserving the natural resources, we can normal balance in the global climatic change and biological diversities. In June 1992, more than 100 heads of states including India met in the first Earth Summit called Rio de Janeiro Earth Summit. The Summit was convened for addressing urgent problems of environmental protection and socio-economic development at the global level. The assembled leaders signed the Declaration on Global Climatic Change and Biological Diversity. The Rio Convention adopted Agenda 21, signed by world leader in 1992 at the United Nations Conference on Environment and Development (UNCED), for achieving

Sustainable development in the 21st century. This Agenda 21 aims at achieving global sustainable development. It is an agenda to combat environmental damage, poverty, disease through global co-operation on common interest, mutual needs and shared responsibilities. One major objective of the Agenda 21 is that every local government should draw its own agenda 21. Hence initiatives are taken by the Indian government by implementing various legislations and creating awareness among the people to conserve natural resources.

WORK FOR YOU –

1. Make a list of 5 resources used by you.
2. Make a list of 5 resources used in your school.
3. Make a list of 5 resources from each kind of resources and name them.
4. List at least 5 human resources found in and around your surroundings.

Exercise **Exercise** **Exercise** **Exercise** **Exercise**

Multiple choice questions

a. Which one is the irreplenishible resource?
   1. Wind energy 2. Educational institution 3. Coal 4. Water

b. Which of the following is community Resource ?
   1. Building 2. Burial ground 3. Cultivation land4. pantation and agricultural land

Distinguish between

1. Renewable and Non-Renewable Resources
2. Irreplenishible and Flow or Replenishible Resources

Write short notes in one sentence

1. Stock (Resource Stock)
2. National Resources

Answer the following questions

1. How can any material convert into Resources?
2. What are resources important for?
3. What do you mean by resource conservation?
4. What do you understand by term “Sustainable development”?

LESSON 2 : LAND RESOURCES

We live on land, we perform our social and economic activities on land and we use it in different ways. Thus, land is a natural resources of utmost importance. It supports natural vegetation, wild life, human life, economic activities, transport and communication systems. However, land is an asset of finite magnitude, therefore, it is importance to use the available land for various purposes with careful planning.

Various usage of land

Land is our basic resource. It carries load of all living and non living things. Man use the land for various activities like

1. We have drawn most of our sustenance and much of our fuel, clothing and shelter from the land. It is useful to us as a source of food, as a place to live, work and play.
2. Land is used for various agricultural purpose and cultivation of food crops.
3. Villages, town, various technical, educational, health, market and Government institutions are set up on the land
4. Roads, national highways, airport, sea and rivers harbours, canals and various other modes of communications are setup on land besides the news broadcasting centers.
5. Various minerals in liquid form are extracted from the inner and outer surface of the called crude oil which further sent to refineries for further refinement.
6. Forests and pasture lands and the animals sheltered in these lands fulfill the needs of man apart from maintaining balance in ecological and climatic changes.

Different types land resources –

Different types of land resources are found the Earth's surface. The Earth's surface is divides into two parts i.e. 29 % is land and rest 71% is water. As per the altitude of the land from the sea level, the land is divided into 3 parts – high lands i.e. mountains with steep slopes and peaks, medium height lands with flat table lands called plateaus and low lands with river valleys and coastal plains besides these, sea, lakes and islands too are a part of the land resources.

In India, the total extent of land resource is 32 lakhs and 87 thousand square kilometers. Out of which 43% are plains, 30% are mountains and 27% are plateaus. Ganga and Brahamaputra basin, East and West coastal plains, Plateaus like Chhota Nagpur Plateau, Southern Plateau or Deccan Plateau, Malwa Plateau, Reva Plateau etc. Mountain ranges like Himalayas, Vindhyas, Aravalli, East and Western Ghats etc. are the examples of Land resources.

Plains provide the facilities for agriculture, industry, habitation etc. Mountains ensure perennial flow of some rivers, provide facilities of tourism and ecological aspects. Plateaus possesses rich reserves of minerals, fossil fuels and forests, coal, wild animals etc.

As mountains, hills and plateaus are high level lands and soil is eroded due to rains and it cannot retain the water and hence difficult for cultivation of crops or not agricultural land whereas plains contain highly fertile soil and hence yield high agricultural profits. Due to difference in height and climate, 55% of coastal plains of India are used for agriculture which is about 11% of total agricultural of the world.

Land Utilisation

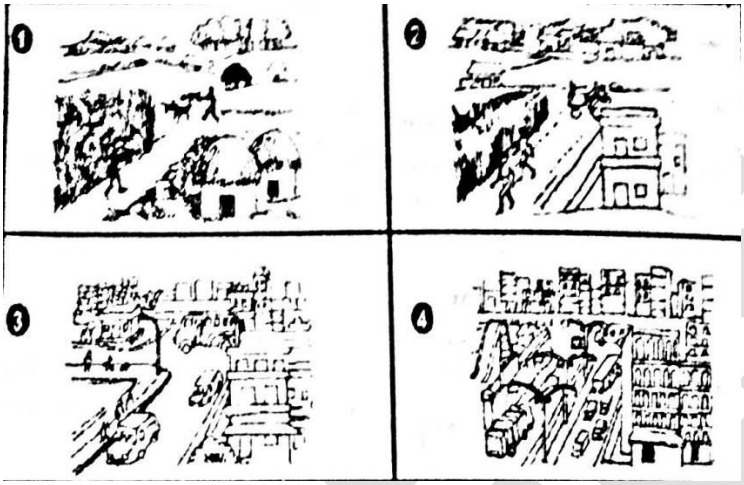
Land resources are used for the following purposes :

1. Forests
2. Land not available for cultivation
   a. Barren and waste land
   b. Land put t non-agricultural uses, e.g. buildings, roads, factories etc.
3. Other uncultivated land (excluding fallow (uncultivated)land)
   a. Permanent pastures and grazing land
   b. Land under miscellaneous tree crops groves (not included in net sown area)
   c. Cultruable waste land (left uncultivated for more than 5 agricultural years)
4. Fallow lands
   a. Current fallow (left without cultivation for one or less than one agricultural year)
   b. Other than current fallow-(left uncultivated for the past 1 to 5 agricultural years)
5. Net sown area
   Area sown more than once in an agricultural year plus net sown are is known as gross cropped area.

DO YOU KNOW – Man utilizes the land resource in different ways to live on it. He uses it for setting up of colonies for human settlement, agriculture, animal husbandry, communication and construction for transportation, forestation, mineral extraction, construction of factories and manufacturing units, setting up of markets and emporiums etc. It is known as Land **Utilisation**.

LAND USE PATTERN IN INDIA

The use of land is determined both by physical factors such as topography, climate, soil, plants, minerals water etc as well as human factors such as population, density, education, business knowledge, technological capabilities and culture and traditions etc. These factors vary from place to place and land resources are used in various ways depending upon the regions also.



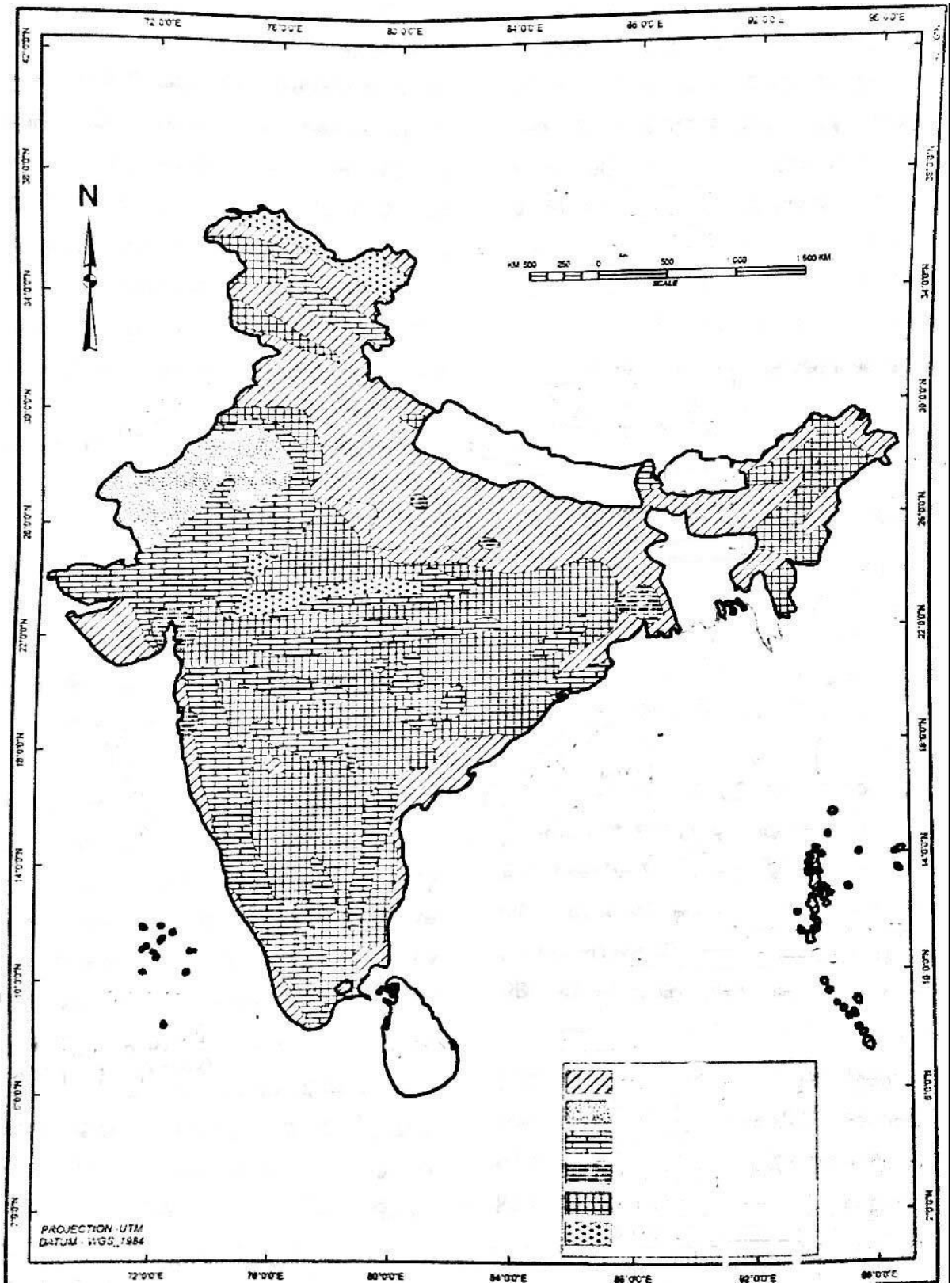
CHANGE IN LAND UTILISATION WITH TIME

In India, the total land resource is 32 lakhs 87 thousand square kilometers. Among all resources, land resource plays an important role due to its tropical conditions and favourable monsoon and climatic changes.

FOREST LAND

Forests account for 22.5 percent of the total surface area of the country. Forest area of the country is far lower than the desired 33 percent of the geographical area, as it was outlined in the National Forest Policy (1952). 60 percent of it belongs to mountain region and 20 percent in plains. Due to increase in population, requirement of land is also increasing for human activities and agriculture which is leading to depletion of forest land. This resulted into change in climate, irregularity in monsoon rains, increase in temperature, repeated cyclones etc.

India has 2.4 percent of the total land resource of all over the world and has a population of 16 percent of the total population of the world. Therefore, every man needs 0.48 hectares of land for his use which is lowest as compared to the rest of the world. (e.g Russia – 8.43 hectors and china – 0.93 hectors)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Maximum amount of forest land is found in Andaman and Nicobar islands and Arunachal Pradesh. It covers around 80 percent of total area. States like Mijoram, Nagaland, Meghalaya, Tripura, Jammu and Kashmir and Dadar Nagarhaveli have 40 to 80 percent of forest land, Goa, Assam, Sikkim, Madhya Pradesh, Odisha, Kerala, Manipur, Andhra Pradesh, and Himachal Pradesh have – 20 to 40 percent forest land rest of the states it contains less than 20 percent. States like Punjab, Haryana, West Bengal, Uttar Pradesh and Bihar have depleted the forest land for agriculture use. Forests of lower regions of Himalayas are cut for agriculture and rehabilitate the people who expelled while division of the nation.

The main reasons for deforestation is human settlements mainly development of townships , increase in land requirement, increase in cultivable land/agriculture land, establishment of educational institutions, modes of communication and extraction of minerals and planning for storage of water and river valley projects etc. besides natural calamities and human activities.

In order to stop deforestation, Government of India has taken many steps like society/ community base afforestation, agriculture base afforestation, reclamation of forests, forest conservation, construction of water tanks etc are most important.

PERMANENT PASTURE AND GRAZING LAND

Around 4 percent of the total land of India is used as Permanent Pasture and Grazing land but in real sense there is no such demarcation of this land. Many a times forest and agricultural lands are also used as pasture land. In villages, grazing lands are converted into buildings, various educational institutions, health centers etc. Pasture lands are mainly found in state near Himalayas like Jammu and Kashmir, Himachal Pradesh, Uttarakhand, hilly area of North East states, hilly areas of Western Ghats. Himachal Pradesh in India is famous for pasture lands and animal breeding is the main occupation.

AGRICULTURAL LAND

Two third of the total population of India directly or indirectly depends on the agriculture/cultivation or agro related occupations. Most of the land in India is used for growing various food crops, cash crops, oil seed, growing vegetation, flora and fauna etc. which though highest in the world still not sufficient for the people of India because of its increasing population.

The land used for the agriculture nearly 32% of the total land dimension of the world and in India it is between 46 to 64 percent. In India, the acreage of average agriculture land is increasing since independence , it was 118.75 million hectares in 1950-51 increased to 187.56 million hectares in 2011-12.

As the river valleys of Ganga, Brahmaputra, Mahanadi, Godavari, Krishna, Kaveri, Narmada, and Tapti rivers and its tributaries besides East and West coastal plains of India have lot of fertile lands and carry the fertile Alluvial Soil, agriculture is the chief occupation in these areas. Agriculture is the chief occupation in the plateaus of Gujarat and Maharashtra, lands of river valleys and peninsular regions of India. Dry-farmed cultivation, terrace farming and plantation farming found near the mountain slopes and some places of plateaus etc. and shift cultivation is found Odisha, Assam, Chhatisgarh where the trees of forest are either cut or burnt to cultivate crops.

LAND NOT AVAILABLE FOR CULTIVATION

Land is used for the occupations which not related to agriculture are seen in this land.

a) Establishment of human settlements, modes of communication, canals, mining and quarrying etc.
b) Cultivation is not possible in barren and non agricultural lands like mountains, hills, deserts, wet lands, river etc.

The former case, the use of land is increasing day by day due to increase in population. It was 9.36 million hectares in the year 1950-51 increased to 22.17 million hectares in 1955-56 due to the economic development of the country like modernization and establishment of new cities, construction of highways, technological development etc.

Similarly, in later case, barren and agricultural land are converted to agricultural land. The 38.16 million hectares in the year 1950-51 increased to 19.21 hectares in the year 1995-96 due to establishment of various cultural institutions and used for agricultural purpose.

FALLOW LAND

a. Current fallow land left without cultivation for one or less than one agricultural year.
b. Other than current fallow land left uncultivated for the past 1 to 5 agricultural years.

The above two types of land are known as fallow land but these type of lands are no more seen now a days. In order to cater the needs of increased population, good quality fertilizers, irrigation, qualitative seeds, technologically developed methods of cultivation are used to cultivate these fallow lands. Fallow lands are seen in state like Tamil Nadu, Bihar, Andhra Pradesh, Nagaland, Manipur, Meghalaya, Rajasthan and Karnataka.

OTHER UNCULTIVATED LAND (EXCLUDING FALLOW (UNCULTIVATED)LAND)

The above type of land is seen in villages as well as in cities where the land is used for human settlement, roads, rail communication, airports, sea ports, education, health, and various government institutions, permanent pasture and grazing purpose, orchids etc. In cities and towns, due to increase in population, people are converting the agricultural lands and cutting

forests for their shelter i.e. residential purpose. In some place, even the agricultural lands are used for construction of technical institutions, roads, railway lines even for mineral extraction.

Ninety-five percent of our basic needs for food, shelter and clothing are obtained from land. Even though, India is economically developing but simultaneously over-utilization of land for economic purpose resulting into degradation of the agricultural land. Hence, human activities have not only brought about degradation of land but also aggravated the pace of natural forces to cause damage to land.

At present, there are about 130 million hectares of degraded land in India. Approximately, 28 percent of it belongs to the category of forest degraded are, 56 percent of it is water eroded area and the rest is affected by saline and alkaline deposits. Some human activities such as deforestation, over grazing, mining and quarrying too have contributed significantly in land degradation.

CONSERVATION OF LAND OR SOLUTION FOR LAND DEGRADATION PROBLEMS –

There are many ways to solve the problems of land degradation.

1. Afforestation and proper management of grazing can help to some extent.
2. Planting of shelter belts of plants, control on over grazing, stabilization of sand dunes by growing thorny bushes are some of the methods to check land degradation.
3. Proper management of waste lands, control of mining activities, proper discharge and disposal of industrial effluents and wastes after treatment can reduce land and water degradation in industrial and suburban areas.
4. Land can be conserved by adapting proper steps to stop soil, wind and gully erosion.
5. Land reform policies need to be reoriented for proper usage of land.

WORK FOR YOU -

1.Prepare a list how the land resource is used in your village or city.

2. Make list of necessary things we get from the Land Resource.

Exercise

1. **Answer the following questions**

   a. How should we use land resources?
   b. Explain Land resources used in India.
   c. How to solve the land degradation problems?

2. **Write short notes in one sentence**

   a. Fallow land b. Degraded land

LESSON 3 : SOIL AS RESOURCE

Soil is the most important renewable natural resource. It is the medium of plant growth and supports different types of living organisms on the earth. The soil is the living system. It take millions of years to form soil up to a few cm to depth hence many geologists treat it as not a worthy resource. All living beings on Earth directly or indirectly depend on the plants only and soil is the medium of plant growth. Hence both plants and animals depend on soil for their food. The entire society depends on agriculture and agriculture base products which depicts that soil is an important resource.

SOIL FORMATION (pedogenesis)

Soil is formed at the deep surface of the earth. At this deep layer, various forces of nature like change in temperature causing contraction and expansion of the rocks, action of hailstones and glaciers, action of plants, animals and man, break the rocks into small pieces. This process of breaking of rocks into small pieces is known as grinding. These grounded small pieces of rocks are the important particles of the soil. Various forces of nature grind these igneous rocks, sedimentary rocks and metamorphic rocks and depleted small particles of these rocks mix with wind, water, minerals and decomposers and reach to the surface of the earth in the form of thin top soil. Because of this lengthy process, soil is a complex matter.

Soil formation is a very slow process. It takes millions of years to form soil up to few cm to depth. Organic materials like sand, clay, silt, air, water and inorganic materials are the main components of the soil.

REGULATORS OF SOIL FORMATION

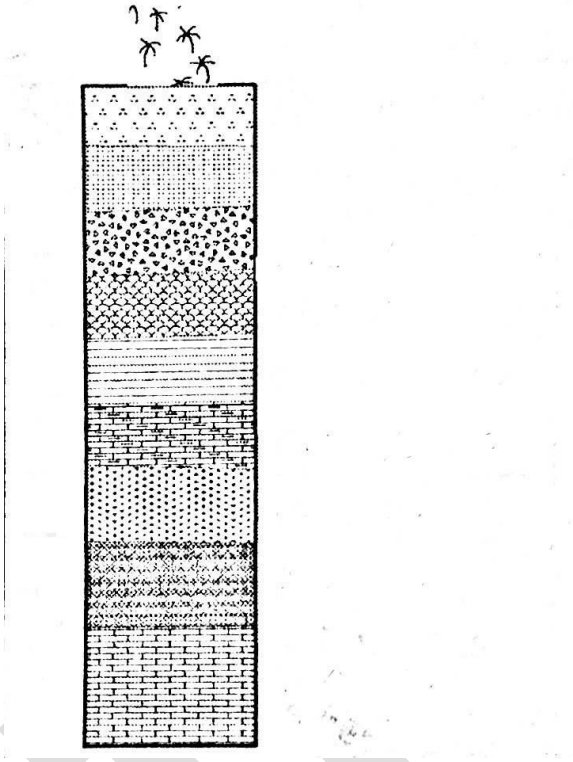
The factors like stone particles (formed from parent rocks by weathering), living organisms, climate, topography etc which play an important role in soil formation and are the regulators of soil formation. Relief, parent rock or bed rock, climate, vegetation and other forms of life and time are important factors in the formation of soil. Various forces of nature such as change in temperature, actions of running water, wind and glaciers, activities of decomposers etc. contribute to the formation of soil. Chemical and organic changes which take place in the soil are equally important. Soil also consists of organic (humus)
and inorganic materials. Soil is formed from parental / elementary rocks and these rocks only differentiate colour of the soil, thickness, texture, structure, age, minerals, quantity of living organisms, chemical and physical properties.

Amount of soil deposit, density of the soil layers depend on topography and age of the soil. The quantity of living organisms present in the soil is influenced by the plants, animals and micro-organism present in that area. The climatic factors like temperature, rain, wind flow etc regulates the formation of the soil. Rivers, wind, cold waves etc influences the soil development.

Six factors influence the formation of soil

1. Surface structure	2. Surface relief
3. Sloping	4. Climate
5. Natural Vegetation	6. Organic matter

Soil has both physical and chemical properties. The physical properties are its colour, nature of formation, texture, porosity etc whereas chemical properties include the acidic and saline nature.



If you observe the vertical section of the soil, you will find that it is divided into many layers from bottom to top layer, like elementary rocky layer or bed rocks, grounded rocky layer, sand, silt mixed sludgy layer, and top layer containing the organic and non organic matter.

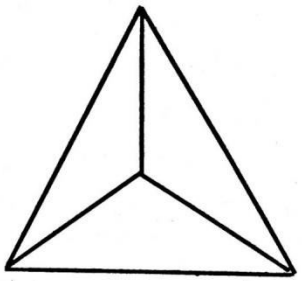
DIFFERENT TYPES OF SOIL

Factors responsible for soil type

1. Elementary Rock	2. Surface Relief
3. Climate	4. Natural Vegetation
5. Fallow Land	

On the basis of the factors responsible for soil formation, colour, thickness, texture, age, chemical and physical properties, the soil of India can be classified in different types. Depending up on the structure of the soil, it is divided into two large groups called Transported Soil and Residual soil. By the grinding methodology, the bed rocks break into small pieces by weathering and deposit at the same place, this type of soil is known as residual soil. This residual soil which are very small, carried away by the various means of natural external forces like wind, river, (ice)glaciers, water etc. into various places, this carried away soil is known as Transported Soil. E.g Alluvial, Loess etc.

Depending upon the size and quantity of the weathered rocks, soil is divided into four types i.e. Alluvial, Sandy, Loamy and Clayey. Alluvial, Sandy and Clayey soil mixed together to form Loamy soil and is highly fertile, helpful for Sugar Cane growth.



Soil is basically depend on climate of that area. Regions having the humid climate, due to heavy rains, water carry away sand, lime(calcium), different metals like potash, sodium, magnesium etc leaving heavy metals like iron and alluminium from the soil. As a result of which it become an acid salt with very less organic matter. It is known as **Pedalfer Soil**. It is red in colour and found in humid regions of India i.e. Southern India.

Similary, the North and Western regions of India where the climate is dry and moderate having less rainfall, as a result of which the soil in this region contains maximum amount of calcium and it becomes basic in nature. This type of soil is called **Padocal Soil.**

Depending upon the relief features, landforms, climatic realms and vegetation types, ICAR, Indian Council of Agriculture has divided the soil into nine types.

1. **ALLUVIAL SOIL** – Alluvial soil is the most important soil in India because most of the people depend on this type of soil. It is a transported type of soil and is covers 43% of the total land of India or 64 million hectares of fertile land. Alluvial soil is found as transported soil in the regions like Plains of river valleys, deltas and triangular peninsular land etc. The entire Northern plains consists of Alluvial Soils. They have been brought down and deposited by three enormous Himalayan Rivers, Sutlej River, Ganga River and Bhahmaputra River and their tributaries. Through a tapered outlet in the state of Rajasthan, they continue into the plains of Gujarat. They are common in the eastern coastal plains and also deltas of Mahanadi, Godavari, Krishna and Kaveri rivers apart from the triangular peninsular regions. It is also found in Western Coastal plains like

Gujarat, Karnataka, Maharashtra and Kerala. In Odisha, it is found near the coastal plains and river valleys.

These soils consists of diverse ratios of clay, sand and silt. As it contains maximum metal and organic substances, it is highly fertile and useful for agriculture. Alluvial soil contains a large amount of Potash and Calcium (lime) but lacking in nitrogenous and organic substances. Therefore to increase its fertility, we have to use fertilizers.

Two types of Alluvium are generally found through out the Indo-Gangetic plain and are distinguished from each other by the size of their grains or particles and age. They are grouped in old alluvium or Bangar and new alluvium or **Khadar.** The newer alluvium (Khadar) is a light friable loam with a mixture of sand and silt. It is found in river valley, the floodplains and deltas. Every year due to heavy rains and floods, soil is eroded and carried away by the river water and rapids and get deposited near the river banks forming sediments of the alluvium which are the fine grains fine-grained fertile soil. It is light black in colour. Whereas the older alluvium **(Bangar)** lies on the inter fluves. The higher proportion of clay makes the soil sticky and drainage is often poor. It is often found in the place where flood water does not reach or away from river beds. Hence, it is known old alluvium and formed by the old soil, Hence, it is black in colour. The old alluvium often contains Kankar nodules or calcareous deposits, with calcium carbonates in sub-soil, hence it is also known as **Kankar Soil**. The new alluvium is richer than the old. Fan shaped alluvium or alluvial fans are found near the foot hills Shivalik hill in the Himalayan Range. It width is about 8 to 16 kilometers. This is known as Bhabar Soil. All the streams disappear in this region and flow underground. Similarly the lower regions of the Himalaya, south of Bhabar, marshy, swampy and wet land of about 20 to 30 kilometers run parallel to Bhabar is known as **Terai**. The streams which disappear in the Bhabar region re-emerge on the surface and give birth to marshy area. It is composed of comparatively finer alluvium with chemical composition and is covered by swampy, marshy and dense forests. Most parts of Terai are reclaimed for agriculture and intensive cultivation, after India became independent.

In arid regions where the soil is dry, it is known as Ray soil. Coast plain of Konkan, Maharashtra the soil is alkaline in nature called alkaline soil. Thin particles sand particles of Thar desert of Northwest Rajasthan which contains 20% clay and balance equal parts of sand and silt that are loosely cemented by calcium carbonate and wind is blown by the wind towards Punjab, Hariyana, West of Uttar Pradesh and West Madhya Pradesh and form non-productive sediments called Loess.

Rice, Jute, Sugarcane, Whea, Cotton, Bajara, Oil seeds and fruits and vegetables are sown in Alluvial soil. Therefore the area having alluvial soil is called Rice and Wheat bowl of India.

2. **RED SOIL :** These are the crystalline igneous and metamorphic rocks found in the places where there is less rainfall. It is rich in metals like iron, magnesium, potash, phosphate and natural metals but is lacking of nitrogen, organic matter, phosphoric acid and lime. Due to presence of hematite, the colour of the soil is red. It is porous and fibrous in structure. Sometimes this soil is also known as Yellow Soil due to presence of water. With the help of irrigation, cotton, wheat, pulses, tobacco, jowar, tomato, and various fruits and vegetables are cultivated on this soil. This soil is found in Chota Nagpur Plateau of Jharkhand, Plateaus of Odisha and Karnataka, Telengana, Tamilnadu, Bundelkhand plateau of Uttar Pradesh, Balaghat of Madhya Pradesh, Chittorgarh and Ajmer of Rajasthan, Meghalaya, Manipur and Nagaland. When this red soil mixes with granite, gneiss and diorite become Red Loamy Soil and only with granite it forms Red sandy soil which generally found in Eastern and Western Ghats and Southern India. This type of soil is useful for Bajara and Maize cultivation.

3. **BLACK SOIL :** Because of black colour of the soil, it is known as **Black Soil or Regur or black cotton soil**, Internationally it is termed as Tropical Chernozem Soil or Black-red Soil. This soil is formed by the disintegration of volcanic basaltic lava, as result it contains iron and aluminum which makes the colour of the soil black. Due to rich in chemical compound like Aluminium, Potash, Organic matter, lime, Calcium, Magnesium, it is useful for cotton cultivation apart from wheat, cotton, jowar, millets, tobacco, sugarcane, castor seeds, fruits and vegetables etc. It is lacking nitrogen, phosphorous and not acidic in nature. The most important character of this soil is its ability to retain heat and moisture which makes the soil very fertile. This type of soil is seen in Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Chattisgarh, Andhra Pradesh, Tamilnadu, etc. In Odisha this kind of soil is found in Angul, Attamallik, Baudh etc.

4. **LATERITIC SOIL :** The term Laterite is derived from the Greek Word 'Later' which means brick. When it is hydrated (mixed with water) it becomes soft and turn hard when it is dry. This type of soil is found in the extreme tropical monsoon climatic condition having high temperature and heavy rainfall. They generally form under hot and humid climatic conditions particularly found on high flat erosion surfaces in areas of high and seasonal rainfall. Loss of nutrients by accelerated leaching is the most common feature which renders the soil infertile. Hence this type of soil is lacking nitrogen, phosphorous, organic compounds, potash, lime, magnesium etc. In some areas this soil is red in colour due to presence of iron while in other areas it is white due to presence of lime and known as white laterite soil. Upper surface of the soil is yellow or light in color while inside it is red in colour. It contains iron, silica, alluminium and various other metals. Laterite Soils are suitable for cultivation with adequate doses of manures and fertilizers. The laterite soils in high land are highly acidic in nature as compared to low lands. Rice, seasamun(rasi), sugarcane and chilli are main crop found in this soil. Laterite Soil is mainly found on summit (top) of Western and Eastern Ghats, Mountain ranges like

Rajmahal Vindhya and Satpura range etc. It is also found in the foothills, river valleys, and different states like Kerala, Assam, Andhra Pradesh, Odisha, Jhakhand, West Bengal, Meghalaya, Maharashtra and Karnataka. In Odisha, it is found in Baleshwar, Cuttack, Dhenkanal, Khorda, Ganjam, Koraput, Mayurbhanja, and Sundargarh districts.

5. **MOUNTAIN SOIL :** This type of soil is found in River valleys and hill tops of Himalayan Range having a height of about 2100 to 3000 meters above the sea level. It is found in less depth and immature soil. Difference between carbon di-oxide and nitrogen can be well noticed. It is alluvial-loamy or loamy soil. It is brown or dark brown in colour. It is also found as Loamy Podzolic soil in the medium range hilly areas like Darjeeling, Assam, Uttarakhand, Himachal Pradesh and some places of Jammu & Kashmir. Coniferous trees like cedar, fir, pine are found in mountain soils. Similarly, Soil found in highest peaked Mountains covered with snow are called Brown soil or Red-loamy soil or Rendzina or Gley. Agriculture is not possible in this area, only fruits and vegetables are grown in some places.

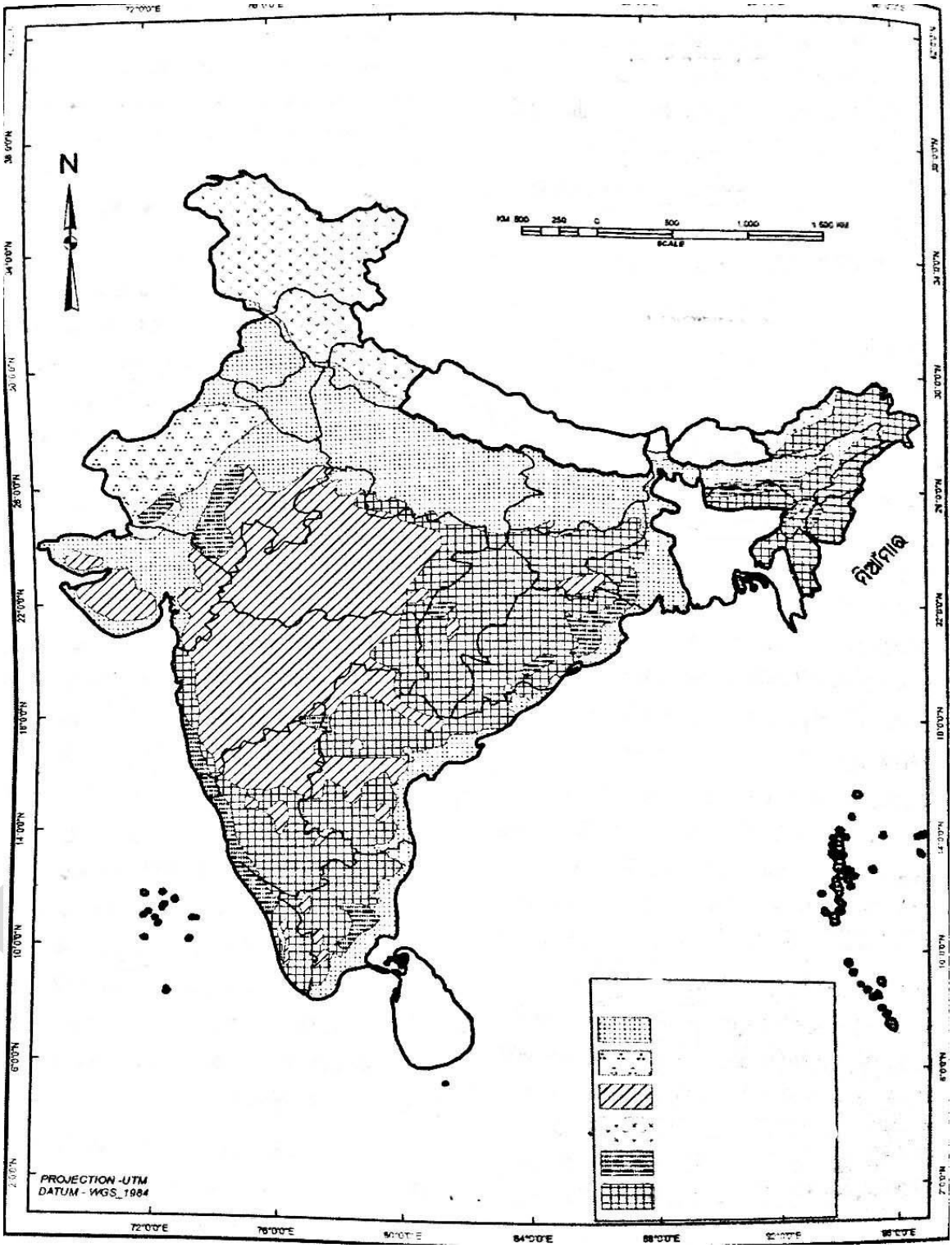
6. **FOREST SOIL :** Forest soils seen in alpine forest are generally found in Himalayan Range nearly 3000 meter to 3500 meters high above the sea level. Leaves fall from the trees of hill slopes to foothills get decomposed by the microbes and form forest soil. It contains maximum amount of organic matter and change into black in colour. At some places it is grayish brown or grayish red in colour. It contains maximum amount of organic and nitrogenous matter and less of Potash, Phosphorous, and lime. Hence by using fertilizers, cultivation can be done on this type of soil.

   Cash crops like tea, coffee can be grown here besides fruits, barley, maize, wheat, spices etc. are grown here. Forest soils are found in terrain regions of Assam, Meghalaya, Sikkim, Manipur, Karnataka, Kerala, Tamil Nadu, Eastern and Western Ghats, Uttar Pradesh and Uttarakhanda.

7. **DESERT SOIL :** This type of soil is found in arid and semi arid climatic regions and covers around 15% of total land area of India. Mostly it is seen in the Western regions of India, especially, in Thar desert of Rajasthan, Sourashtra and Rann of Kuchchh of Gujarat, Punjab and Haryana. Its water holding capacity of very less.

   It contains maximum amount of sand, salt, phosphorous but less in organic matter, nitrogen and calcium carbonate and hence water holding capacity is least. Through irrigation, desert lands can be made fertile. E.g. Indira Gandhi Canal situated in Ranganagar district of Rajasthan is used for the irrigation purpose to make the soil fertile in the various regions of Rajasthan and is helpful in growing of food grains and cotton. In other areas, Jowar, Bajra and other grains are grown with the help of irrigation. As per the effects of the Primary rocks, desert soils found alongside the

Aravalli hills is known as Rogolith Desert Soil while Lithojalik Desert Soil is found in Pokharan and Jaisalmer of Rajasthan. Desert soil contains organic matter of Desert Plants like Cactus.



8. **SALINE AND ALKALINE SOIL :** This type of soil is found in arid and semi arid regions of India, like Rajasthan, Uttarpradesh, Hariyana, Punjab, Bihar and Maharashtra. It contains saline and alkaline chemicals like Sodium, Calcium, Magnesium, etc. Saline Soil contains

less Sodium and more alkaline chemical compounds. It is infertile in nature and its fertility is increased by adding fertilizers to it. Saline and Alkaline soil is sandy and Loamy in nature lacks Calcium and Nitrogen. It is less moisture i.e. water holding capacity is very poor. This type of soil is also commonly known as **Usar Soil** in Uttar Pradesh and Punjab. Salaine and alkaline soil is also found in the coastal areas of India. Through irrigation, this type of soil can be converted into cultivating soil and crops like Rice, Sugarcane, Wheat, Cotton and Tobacco are grown on it.

9. **PEATY AND MARSHY SOIL :** Peaty soils originate in humid regions as a result of accumulaton of large amounts of decomposition of the plants/leaves forming organic matter in the soils. Small plants and grass remain submerged in water in the lower lands due to heavy rainfall for long time get decomposed and turn into soils. Due to decomposition its colour changes into black. It becomes heavy and highly acidic in nature. It contains organic matter and salts and lacks phosphates and potash.

   Peaty soils are basically found Kottayam and Alappuzha districts of Kerala and it is known as **Bari Soil**. Marshy soils with a high proportion of vegetable matter also occur in the coastal areas of Odisha and Tamil Nadu, Sunderbans of West Bengal, in Bihar and Almora district of Uttaranchal.

PROBLEMS OF INDIAN SOILS : Indian soils are suffering from a number of problems like i) Soil erosion ii.) fertility loss iii.) Desertification, iv.) Water logging, v.) Salinity and alkalinity, vi) Wasteland, vii) urbanization and transport development and viii) interference of man.

Soil Erosion is the gradual removal of the top soil cover by natural agencies like wind, water, rains, glaciers, tidal waves of sea etc. and also by animal and human interference. Increase in population, construction of roads and building by cutting trees, urbanization, deforestation, over-grazing of cattle, fallow land and heavy rain are also play an important role in soil erosion.

1. The problem of soil erosion is taking a menacing form in a country like India characterized by heavy down-pour of rainfall as a result of which lakhs of tones of fertile soil is being washed away by running water during rainy season especially in the areas like hill slopes of southern Himalayas, Assam and other North Eastern States and Eastern and Western Ghats of India. Besides hill slopes, in the plains like Uttar Pradesh, Bihar, Jharkhand, Chatisgarh, Madhya Pradesh, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu where soil is eroded due to heavy rains.

2. States having arid or semi arid climate having less rainfall and vegetation e.g. Rajasthan, Gujarat, Punjab, Haryana, Madhya Pradesh etc., the soils are eroded by wind. Total soil erosion in India is 21 percent of the total surface area of the land coverage.

Water erosion is of three types –

i) the uniform removal of soil from the sloping surface is called sheet or surface erosion
ii) the formation of finger-shaped grooves is called rill erosion
iii) the enlargement of the rills leads to the gully formation and gully erosion which converts the land into ravines and badlands. The **Chhos** of the Northern Haryana and Punjab and the badlands (ravines) of Madhya Pradesh, Rajasthan and Uttar Pradesh are the results of gully erosion in India.

The tidal water of sea the sea cause considerable damage to the soil along the sea-coast. The rushi waves dash against the sea-coast and break hanging cliff rocks. The broken material is removed by the retreating sea waves. Severe erosion of beaches along the Kerala coast is evidenced by the uprooting of coconut trees. This type of sea erosion is seen throughout the eastern and western coasts the country.

In India, maximum soil erosion takes place in Rajasthan. Similarly, states like Madhya Pradesh, Maharashtra, Uttar Pradesh, Gujarat, Andhra Pradesh and Karnataka also have high rate of soil erosion. States like Arunachal Pradesh and Punjab has very less soil erosion. Odisha experiences medium range of soil erosion.

Due to soil erosion land looses fertile top soil, minerals, water retaining capacity etc. as a result the capacity of growth of the vegetation reduces, natural calamities like floods and famine occur. Sand and Alluvial soils deposit in river beds as a result the height of the river beds increases. This interrupts the economic growth and development of state and nation.

SOIL CONSERVATION –

Soil conservation is the prevention of soil from erosion or reduced fertility caused by overuse, acidification, salinization or other chemical soil contamination. Slash-and-burn and other unsustainable methods of subsistence farming are practiced in some lesser developed areas. By conserving soil, we can fulfill the needs of human beings and also can save or store soil for future generation also. Though Soil Resource is an Exhaustible Resource but it is a renewable resource also. We can increase the fertility of the soil by use various fertilizers and can make the soil to generate high yield of crops. If the top soil of the land is depleted, new soil is formed from the primary rocks but it takes long time. Hence it is important to conserve soil. Soil conservation includes all those measures which help in protecting the soil from erosion and exhaustion. Soil can be conserved in two ways – In short ways i.e. at Local and Personal level and in long ways - at Government level where it is spending lot of money to conserve soil.

Short steps taken to conserve soil

1. Re-plantation of trees in uncultivated land
2. Terrace farming can be done in hill slopes

3. Planting of hard buffer strips e.g. hard grasses, shrubs and trees along the steam banks
4. Restrict overgrazing by animals
5. Construction of shelter belts of trees to control wind erosion
6. Stopping Shift and burning cultivation.

Long steps taken to conserve soil

1. Many Government and Non-Government organizations are taking steps through scientific measures to cultivate on river eroded beds, hard and dry lands.
2. Through re-plantation, new forests are developed and minimize overgrazing of animals.
3. Soil can be conserved through drip irrigation
4. Construction of dams and reservoirs to control floods
5. Floods can be controlled and soil can be saves through river linking project

WORK FOR YOU –
1. Collect various types of soil from your region and make list of type of soil.
2. Differentiate between the one feet deep soil of near your house and school premises.

EXERCISE

Answer the following questions

1. Write different steps how soil is formed.
2. Write short notes on Loamy Soil.
3. Write short notes on Transported Soil.

Differentiate between

1. Pedalfer Soil and Pedocal Soil
2. Khadar (New alluvium) and Bangar(old Alluvium) soil
3. Kankar and Terrai Soil
4. Regur and Bari Soil

Write Short Notes on the following

1. Residual Soil
2. Yellow Soil
3. Chernozem Soil

UNIT II

BIOTIC RESOURCES

LESSON – 1 : FOREST AS A RESOURCE

The assemblage of plant species, e.g. trees, shrubs, grasses, creepers and climbers and the like living in association with one another in a given environment is known as natural vegetation. Contrary to this, a forest denotes a large tract covered by trees and shrubs which has an economic significance for us. Thus, a forest has a different connotation than what the Natural Vegetation has.

The variations in climatic conditions in India have resulted in having various types of natural vegetation in different parts of the country. It is so because each plant needs a definite range of temperature, wind flow, quantity of light, soil fertility and precipitation for its growth. Climate soil and plants are closely associated to each other. Plants, animals and micro-organisms together form biosphere and it is an important part of the Geosphere. Biosphere extends up to the height of 10,000 meters in the atmosphere and 11,000 meters deep into the hydrosphere (under the sea) and 250 meters deep in the lithosphere.

DO YOU KNOW - The earth itself is called the geosphere which contains lithosphere (the solid surface layer of the earth), the atmosphere (is the layer of air that stretches above the lithosphere) and hydrosphere (the Earth's water). Since life exists on the earth, in the air and in water, the overlapping of all these spheres where the plants, animals, human beings and micro-organisms inter dependent on each other making a food web is known as **biosphere.**

Starting from very small mosses, shrubs, grass, big trees and various plants all together form natural vegetation. They are classified into different genera and species. A large area containing natural vegetation i.e. various plants, small and big trees, shrubs, herbs, thorny plants etc together is known as **forest.** The animals which depend on these plants and forests are known as forest animals. Forest play an important role in the ecological system as these are also the primary producers on which all other living beings depend.

DO YOU KNOW - Trees, herbs, shrubs and climbers that are born automatically, grow and die without the help of human beings/mankind are known as natural vegetation.

In ancient days i.e. nearly 4 to 5 thousand years back deep forests were existing in India. But due to increase in population and rapid economic growth, most of the forest area is deforested or used. At present only 22.5 percent of total land is covered with forests.

DO YOU KNOW – In order to live in biosphere, all living things, like plants, animals, micro-organisms that share an environment and interdependent on each other is known as an ecosystem.

As per Indian Forest Act (1988), forests play an important role in human life because it is a resource which maintains the balance in the environment as well as in ecosystem. We humans along with all living organisms form a complex web of ecological system in which we are only a part and very much dependent on this system for our own existence.

Place with high rainfall we find long trees and dense forest and less dense forest in low rainfall regions. Areas with less rainfall and high temperature have less dense forest with shrubs and herbs only whereas some areas where there no rainfall we find no vegetation at all. Similarly with the change in climate and temperature, we find there is a change natural vegetation also. Hence we find evergreen leave in the areas with high rainfall and in some areas leaves fall in the beginning of Summer season which is also known as Autumn and some trees have long and spacious leaves. Some trees have needle like leaves. Some plants are indigenous i.e found in a particular region only called **Endemic** whereas some plants are foreign i.e they are not native of that area, they are brought to India are called **Exotic**. Exotic plants are of two type – Boreal and warn tropical plants. Boreal forest is seen in snowy regions and Himalayas high mountain ranges having coniferous trees with needle shaped leaves. This type of forest is generally seen in China and Middle Asia. Warm Tropical forest is seen in African Continent, Indonesia, Malaysia.

TYPES OF FOREST AND THEIR DIFFERENCE AND DISTRIBUTION

India is a vast county and its climate is different from place to place and depends on temperature, humidity, rainfall etc. soil is also different in different places. It is has low lands, high lands, plateaus and high mountain ranges. With a long coastline, large coastline areas have an equable coastal climate. Areas in the interior of India are far away from the moderate influence of the sea have extremes of climate.

In India, maximum forest lands are seen in state like Madhya Pradesh, Arunachal Pradesh and Chatisgarh besides the states like Mijoram, Nagaland and Andaman Nocobar Islands. Scrub Forest is found in Andhra Pradesh. State like Haryana, Goa and Punjab has least forest land. Compare to any other countries, India has less forest land in the world. From the time of British rule, forests of India are distributed into three parts –

1. **RESERVED FORESTS –** this type of forest is controlled by the Government. Wood for fuel and grazing of animals is not allowed for common man in these forests. This type of forest is 53 percent of the total extent of the forest land in Inida.
2. **PROTECTED FOREST** – this type of forests are even though controlled by the Government permission is given to common man to collect wood for fuel and grazing of animals. It 29 percent of the total extent of the forest land in India.
3. **UNCLASSIFIED FORESTS** – this type of forest is not under any one control, it is an open forest where the any one can collect wood for fuel and graze animals. It covers 18 percent of the total forest land of India.

As per the Constitution of India, the forest are divided into 3 parts –

1. **STATE FORESTS** – It is controlled by the State Government. It total area is around 93.8 percent of the total forest area of India.
2. **COMMUNITY FORESTS** – it is controlled by the local government i.e. through Municipal Corporation, Panchayat, City or District Administration etc. Its area is about 4.9 percent of the total forest area of India.
3. **PRIVATE FORESTS** – these forests are owned by the private organization. This type of forest is generally found in the states like Odisha, Himachal Pradesh, Meghalaya, and Punjab. Its extent is only 1.3 percent of the total forest land of India.

India has varied climatic conditions. Depending on the temperature, humidity, climate, rainfall, sunlight, wind flow and soil, forests in India are classified into 9 types :

1. **TROPICAL WET EVERGREEN FORESTS –** Tropical evergreen forests are usually found in areas receiving more than 250 cm of rainfall and having a temperature between 40 degree to 25 degrees. It contains more than 77% of relative humidity. It is mainly found in North-Eastern mountain regions like Assam, Meghalaya, Tripura, Manipur, Mijoram and Nagaland, Western slopes of Western Ghats and Andaman and Nicobar Islands. Tropical evergreen forests are dense, multi-layered and harbour many types of plants and animals. The trees are evergreen as there is no period of drought or frost. The canopy tree species are mostly tall hardwood with broad leaves that release large quantities of water through transpiration, in a cycle that is important in raising as much mineral nutrient material as possible from the soil. Sandal wood, white cedar, rose wood, Teak wood etc are seen in the mountain slopes of Western ghats and Bamboo, gurjan reed and cane are found in the mountain slopes of North Eastern areas. Woods of this forest is even though economical but could not be utilized properly due to dense forest, heavy rains and transport and communication facilities are also not available.

2. **TROPICAL WET SEMI-EVERGREEN FOREST –** bordering the areas of tropical wet evergreen forest, are comparatively drier areas of the tropical semi-evergreen forest. Here the annual rainfall is 200-250 cm, the mean annual temperature varies from 24^{o} C to 27^{o}C and relative humidity 80 percent. These forests are found on the Western coasts, Assam, lower slopes of the Eastern Himalayas, Odisha and Andamans. This type of forests are generally mixture of Tropical wet evergreen forests and deciduous forests. Theses forests are less dense but gregarious than the wet evergreen forests. Here, trees are 24 to 36 meter in height. The important species of these forests are kadam, rosewood, Kaju, bijasal, Kusum, Indian Chestnut and champa etc.

3. **TOPICAL MOIST DECIDUOUS FORESTS –** these forests are found in areas of moderate rainfall of 100 to 200 cm per annum, mean annual temperature of about 27^{o}C and average annual relative humidity of 60 to 75 percent. This forest is also known as Monsoon Forest. Such areas include a belt of evergreen forests both on the western and eastern slopes, a strip alson the shiwalik range including terai and bhabar from 77^{o}E to 88^{o}E, Manipur and Mizoram, hills of eastern Madhya Pradesh and chhatisgarh, Chota Nagpur Plateau, most of Odisha, parts of West Bengal and in the Andaman and Nicobar islands,

   The trees of these forest drop their leaves for about 6-8 weeks during the spring and early summer when sufficient moisture for the leave is not available. The sub-soil water is not enough to enable the trees to retain their leaves throughout the year. The general appearance is burnt up and bare in April-May. These forests again become green when the leaves grow with the onset of the rainy season. Hence these are known as **Deciduous forests**. Tropical moist deciduous forests present species, 25 to 60 meters high, heavily buttressed trees and fairly complete shrubby undergrowth with patches of bamboos, climbers and canes.

   These are very useful forests because they yield valuable timber and several other forest products. The main species found in these forests are teak, sal, padauk, white chuglam, badam, dhup, rosewood mahua, bijasal etc. It is easy to exploit these forests due to their high degree of gregariousness. These forests occupy a much larger area than the evergreen forests but large tracts under these forests have been cleared for cultivation.

DO YOU KNOW – An equatorial evergreen forest is a forest consisting entirely or mainly of evergreen trees that retain green foliage all year round.

4. **TROPICAL DRY DECIDUOUS FOREST -** The Indian dry deciduous forests are actually a type of the Indian deciduous or monsoon forests and they are mainly found in both Northern India and in south Deccan plateau in India. The dry deciduous forests are mainly situated in the areas, where annual rain fall ranges from 70 to 100 cm and range of temperature between 15.5^{o}C to 22.2^{o}C and the relative density is 63 to 77 percent.

   This type of forest is available in a vast and spacious area. It contains Moist Deciduous forest in the Eastern side and tropical scrub forest in the west and at the central regions. Tropical Dry Deciduous Forest is found top North from the Himalayan region to southern region Kanyakumari. It is also found in Uttar Pradesh, Maharashtra, Tamilnadu and Karnataka. Teak, rosewood, Kendu, Sal, Bijasal, Palash, Bel, catechu, Dhak, Sandal wood etc are main trees found in this forest. Some parts of topical dry deciduous forests, are cleaned for agriculture and varied varied practices.

5. **TIDAL OR MANGROVE FOREST –** Tidal or mangrove forests are mainly situated on the Ganga and Brahmaputra Deltaic region and in Coastal Plains in West Bengal, called the Sunderbans which means beautiful forest containing Sundari Trees. The annual rainfall in this area is nearly 120 cm. High tides brings in salt water, and when the tide recedes, solar evaporation of the seawater in the soil leads to further increase in salinity. The return of tide can flush out these soils, bringing them back to salinity levels comparable to that of seawater. At low tide, organisms are also exposed to increases in temperature and desiccation and are then cooled and flooded by the tide. In Odisha mangrove forests are found in the deltaic region of Mahanadi, Bhramani and Baitarini rivers, trees are similar to Sundari but are known as Forest of **Hental trees or Short Sunderbans.**

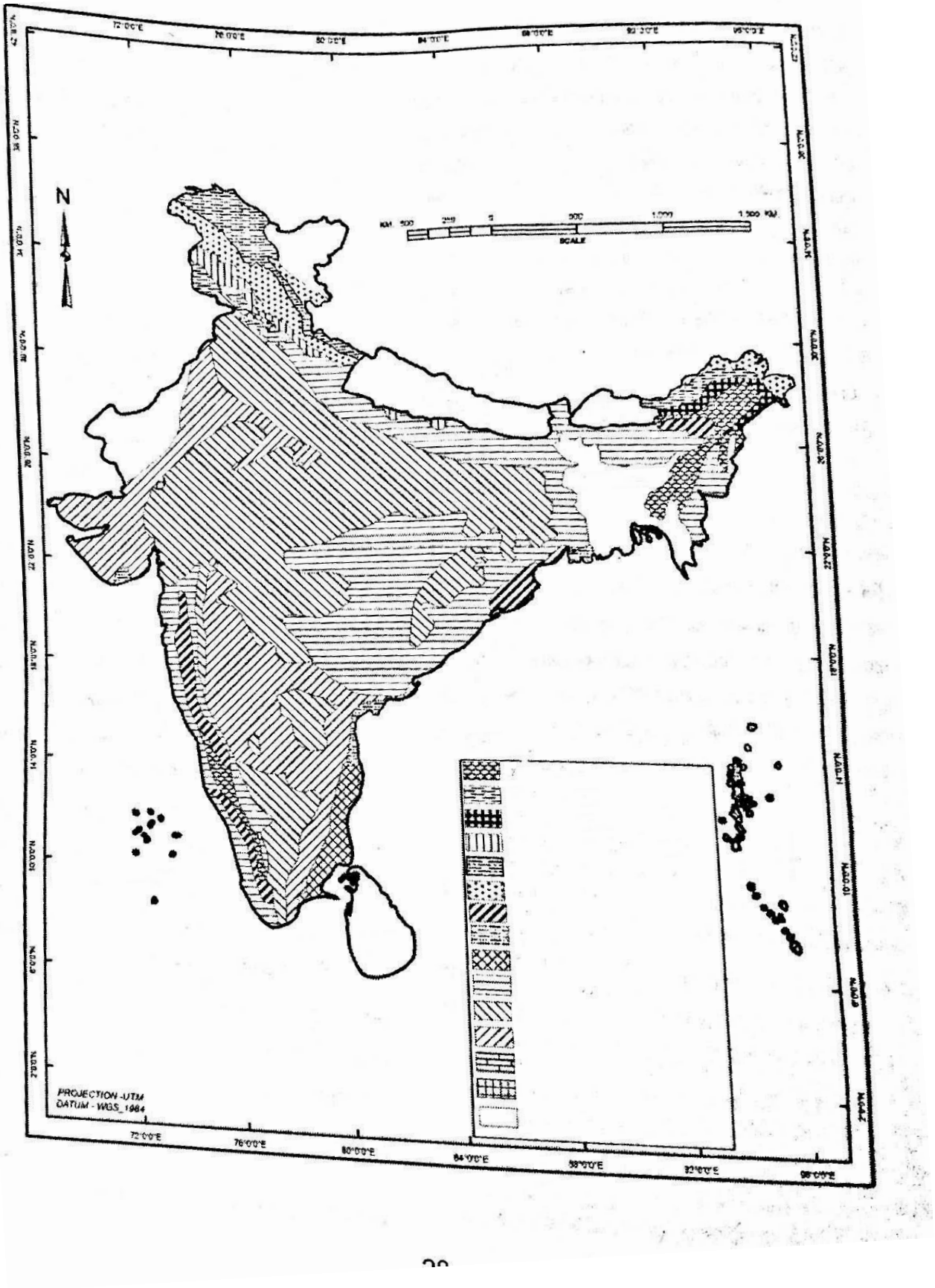
   The wood of the mangrove trees are not useful. They grow up to 30 meter of high and are helpful to control high tides and cyclones hence they work as shelter belts. Nowadays, people are settling in these areas by cutting these forests and using the area for agriculture. Woods of casuarinas trees and jham trees are use for building boats.

   This type of forest is not found in Western Coastal plains because of the narrow, deep and low tides of the sea. Palm, dates, bettlenut, and coconut trees are found in Malabar island.

6. **TROPICAL THORNY AND SHRUB FOREST-** Average rain fall of the forest is about 50 to 75 cm and temperature is about 25^{o} to 27^{o} and relative humidity is less than 47 percent. It is found in dry semi-arid regions. It is found in south-west Punjab, West Haryana, West Uttar Pradesh, Central and East Rajasthan, West Madhya Pradesh, West Gujarat (Sourashtra and Kachcha), and southern regions of Western Ghats.

   In tropical thorny and shrub forests, roots are long, leaves are broad and thorny.
   Average rainfall of the area is less than 50 cm, plants like thorny shrubs, Cactus etc found whereas the area receiving more than 50 cm, grass land with Simili, Babul, Acacia trees are found. Munja, Sawai grass and Bena are the species found in grass

lands. In some places, Cocoa, Kaju, Catechu, Tamarick Palas, etc trees are seen. Gum is collected from the Babul tree and liquid extracted from the Acacia tree is used for tanning leather.



7. **SUBTROPICAL MONTANE FOREST** – depending up on the altitude i.e. the height of the mountains from it sea level, temperature reduces as we go high which effects the growth of the plants and plants are classified as per the altitude.

   Forests occur at the same height as the wet hill forests i.e. 1000 meters to 1800 meters above the sea level but in North-West Himalaya (except Kashmir) like Khasi hills, Naga hills, Manipur etc are called **Sub-tropical Moist Pine Forest**. Its annual rainfall is 100 to 200 cm and temperature is 15^{o} to 22^{o} and relative humidity is 63 to 77 percent. **Chir** is the most dominant tree which forms pure stands. It provides valuable timer for furniture, boxes and building. Places where humidity is more the broad leaves trees are found. Jham, Oak and Rododendron trees and dense granss is seen in these forests.

   Forest founds in the hill slopes of Himalayas about 450 to 1500 meters above the sea level like some areas of Punjab, Haryana, and Kashmir (saltrange and Tigar hills) is called **Subtropical Dry evergreen forest**. Average rainfall of this forest area is about 50 to 100 cm. Rainy season exists for 26 to 29 days only. Maximum temperature is 20^{o} C to 32^{o}C. Plants of Mediterranean climate is found here. Plants with narrow leaves and thorns, Acacia, Olive etc. are found in this forest. Grass and shrubs are seen during the rainy seasons.

   Forest found in Nilgiri and Palnis Hills of Southern India (900 to 1600 meters high from the sea level), Mahabaleshwar, Panchmari (900 meters high) Lower slopes of East Himalayas (90 to 180 meters of height) and in Assam are known as **Subtropical Moist Montane Forests**. Here the annual rain fall is more than 150 cm. Rainy season remains between 78 to 146 days and the temperature is 18^{o} to 24^{o}C whereas the relative humidity is 51 to 81 percent. In this forest, tropical and temperate maximum moist evergreen plants like Jham and selitis are main trees and the height of these trees is between 15 to 30 meters. Oak and Chestnut trees are found in Eastern Himalayas.

8. **TERMPERATE MONTANCE FOREST** – these forests lie 1500 to 2850 meter above from the sea level, on the slopes of the Nilgiis, Anaimalais, Palnis, easter Himalayas and Assam hills. Annual rain fall is more than 15 cm , average annual termperature is between 15^{o} to 18^{o} C with freezing point during winter months (December- February), and dense fog. In south India these forests are called **shoals/sholas** which are dense (tree height 15-18 m) with much under-growth and many epiphytes, mosses and ferns. Mangolia, laurel, rhododendron, plane, elm, prunus and plum are common plant species. Cinchona, wattle and eucalyptus have been introduced from outside. In north India oak, chestnut and laurel are common tree varieties.

   The forests cover the entire Himalayan zone form Kashmir to Sikkim and Arunachal Pradesh between altitude of 1500-3300m. here average annual temperature is 12^{o} – 13^{o}C, rainfall 100-300 cm and annual humidity 56-65 percent. These forests contain mixed species of broad-leafed evergreens and conifers (height 30-45 m). Oak, fir, spruce, deodar, chestnut, cedar, oak and birch (in Satluj valley) are important tree varieties. Deodar is the most important tree and provides a fine durable wood for commercial uses. These forests also contain scrubs, creepers and ferns.

Low rainfall zone where the average rainfall is less than 100 cm like Ladakh, Balistan, Chamba, Lahaul, inner Garhwal and Sikkim and it is 1500 meters above the sea level is called Himalayan Dry Temperate Forests. Here xerophytes scrub with deodar, juniper, Farxinus xanthoxyloides, chilgozah, maple, ash celtis and oak as predominant trees.

9. **ALPINE FOREST –** this type of forest is generally seen in Himalayan range of height 2700 meters to 4000 meters from the sea level. It starts from north western border of Himalaya and extends up to North eastern border. It is a mixture of coniferous and broad-leaved trees in which the coniferous trees attain a height of about 30 m while the broad leaved trees reach only 10 m. Fir, kail, spruce, rhododendron, plum, yew, etc. are important species which lie at the height between 2850 meters to 3600 meters. Southern slopes of Himalayas contains trees of 60 to 90 meters high. The moist alpine scrub is a low evergreen dense growth of rhododendron, birch, berberis and honeysuckle which occurs from 3,000 metres and extends upto snowline. The dry alpine scrub is the uppermost limit of scrub xerophytic, dwarf shrubs, over 3,500 metres above sea level and found in diy zone. Juniper, honeysuckle, artemesia, potentilla, etc. are important species. Pastures are grazed by migratory cattle through **Transhumance Process (**the moving of cattle or other grazing animals to new pastures, often quite distant, according to the change in season). Flowers of Devi Lotus or Brahmakamal and Kunth trees (famous aromatic trees) found in Western Himalayas are used to preparing perfumes and exported.

BENEFITS OF FOREST AND ITS USE

Forests help mankind in different ways that is economically, socially, natural and psychologically. Among all the most important benefits are noted below –

1. It controls the local and regional climates and keep balance between the oxygen and carbon dioxide in the atmosphere.
2. It controls the flow of water and wind velocity on the surface of the earth and protects the earth from natural calamities like floods, cyclones etc.
3. It helps in storage of underground water and controls soil erosion. It also increases the level of the water.
4. Economy of the nation greatly depends on the forests. Plants and animals present in the forests provide us fuel wood, medicines, honey, gum , leather etc. which has high market value.
5. It gives shelter to many birds and animals. Many animals graze in pasture lands of the forests.
6. Many factories/industries are established basing on the forest products like paper industry, matchstick industry, play equipments (cricket bats from willow tree) Rubber industry, Leather, Rayon, medicine factories etc.
7. People use forests for agriculture and cultivate and collect fruits, flowers, leaves etc.
8. Nation earns foreign currency buy exporting forest goods.
9. It attract people for its natural beauty like rivers, tributaries, lakes, waterfalls, healthy climate, animals and birds, aroma of various flowers etc.
10. Forest are also considered as a tourist spot for local and foreign people and it effects the economic growth of the nation.

CONSERVATION OF FOREST

1. One third of the total surface area of the land is covered with forest. 60 percent is in the hilly areas while 20 percent on plains.
2. We can increase greenery near river and canal banks and re-plantation of trees in the land which is unfit for cultivation.
3. Officially forests are divided into 4 parts 1. Protected forests 2. National Forests 3. Village Forests 4. Woodlands, it necessary steps should be taken to preserve these forests.
4. Every year Government should encourage people to plant trees during the months of July and August e.g. Van Mahotsava, Tree plantation week etc.
5. Initiatives should be taken to persuade primitive people not to go for shifting cultivation.
6. Steps should be taken to strong and methodological improvement in forest management.
7. All sorts of help should be provided for implementation of steps taken in forest resource management.
8. Government should take steps to encourage the growth of the forests through research.
9. Trees which give industrial and economical/ business oriented woods should be planted.
10. Afforestation is very essential in order to increase the volume of the forests and to maintain balance in the ecology.

DO YOU KNOW – as per the statistics of the department of forest (1999), the forest land has been increased by 10,098 sq. Km as compared to the year 1997. This is due to afforestation. The Himalayan Yew is now considered to be an endangered plant. It has a medicinal value. It is found *in Himachal Pradesh and Arunachal Pradesh*. A chemical compound or medicine called **taxol** is obtained from it. A juice/ Sap is obtained from the bark, heartwood, twigs, needle like leaves, roots and branches of the trees. This medicine is mainly used for cancer treatment . Due to over exploitation of the trees, this species is now becoming extinct.

WORK FOR YOU –

1. Make a list of things we get from Forest resource.
2. Identify and make a list of trees belongs to Natural Forestation or Human plantation.

EXERCISE

Answer the following questions

1. What is known as shelter belts?
2. What do you mean by transhumance?
3. What is known as natural forest?
4. What do you mean by Boreal plants?
5. Where do you find 'Yew' Plants?

Differentiate the following

1. Biosphere and Ecosystem
2. Reserved Forest and Protected Forest
3. Evergreen Forest and Deciduous Forest
4. Sunderbans and Short sunderbans

Answer in one line

1. Open Forest 2. Chir 3. Sholas

LESSON 2

WILDLIFE AS A RESOURCE

Animals, birds, insects, fish, tortoises, crocodiles, snakes, frogs, maggots, micro-organisms which live in jungle are called Wild life. This entire habitat we live in has immense biodiversity within the biosphere. Like natural plants and forests, wild life also plays an important role in biosphere. This resource belongs to Inexhaustible Resource. In order to keep ecological balance, wild life together with organic and inorganic matter form nutrients cycles, Bio-geo-chemical cycle, flow of energy, food chain, food web for biodiversity. Through Biological pyramid it creates flow of energy, growth and cleanliness in the atmosphere besides balance in the biosphere.

BIODIVERSITY OR BIOLOGICAL DIVERSITY – is immensely rich in wildlife and cultivated species, diverse in form and function but closely integrated in a system through multiple network of interdependencies. Biodiversity is of three types – 1. Genetic 2. Species 3. Ecosystem. As per the biodiversity the entire world is divided into 12 Megacentres, and 18 hotspots. Among all, India is one of the main biological center and it has 2 warm lands (1. North-Eastern India 2. Western Ghats).

TYPES OF WILD LIFE –

Food chain and Tropical level is formed by plants and animals only. Green plants prepare their own food hence they are called autotrophs. They are also known as producers. Animals depend on plants and other animals for their food are called Heterotrophs. They are also known as consumers. Similarly animals and micro-organisms which feed on dead and decaying matter (fungi, bacteria) are called decomposers. As per the Tropical level, organisms are divided into 4 categories. They are Herbivorous or Primary Consumers, Carnivorous or Secondary Consumers, Omnivorous or Tertiary consumers and Saprophytes or Detrivorous or decomposers. Heterotrophs are classified into micro and macro consumers as per the size of the organisms.

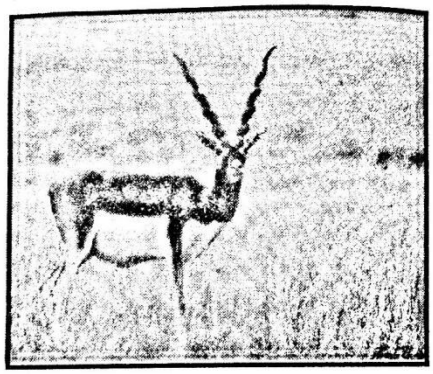
WILD LIFE DISTRIBUTION –

All living organisms directly or indirectly depend on forests, deserts, shrubs in order to survive. Hence they are closely associated with the forest. As per the nature of the earth, soil and atmosphere, India has various types of forests and varieties of wild animals.

India is one among the 12 bio-diversified nations in the world. Around 89,000 types of animals, 1200 species of birds, around 2500 types of fish, and more than 45000 types of plants, varies species of reptiles, amphibians, mammals, insects, worms earthworms etc are found in India.

India is having 5 world famous, 14 biosphere conservative regions and 6 humid areas . To conserve bio-diversity, 96 National parks, 490 Santuaries are spread in around 1.53 lakh square Km of area. Though India occupies only 2.4% of total area of the world, but it has 7.3% of bio-diversity of total bio-diversity of the world.

	TABLE	
	NUMBER OF ANIMALS PRESENT IN INDIA	
1.	ALL SPECIES	89,451
2.	FISH (PIECES)	2,546
3.	AMPHIBIANS	200
4.	REPTILES	456
5.	AVES	1,232
6.	MAMMALS	390
7.	MOLLUSCS	5,070
8.	INSECTS	68,389
9.	MISCELLANIOUS	8,329
10.	PRIMITIVE ORGANISMS	2,577

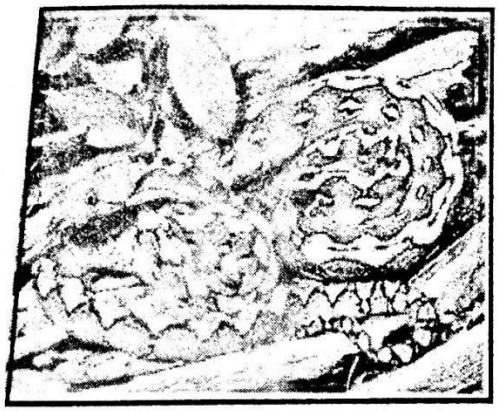


Raindeer

Animals like elephants, lions, tigers, rhinos, bear, deer, raindeers etc live in warm tropical and wet/humid regions of India where Semi evergreen and deciduous forests are found. Elephants are mainly found in the states like Assam, Kerala, Karnataka, Andhra Pradesh, Odisha and Jharkhand.

Lions are found in Gir Forest of Sourashtra, Gujarat. Camels and wild donkeys are found in Thar desert of Rajasthan. Royal Bengal Tigers are seen in Sundarbans of West Bengal. Tigers are found in Odisha also. White tigers are found in Nandankanan wildlife sanctuary of Odisha and in the forests of Reva Plateau. Musk deer, wild sheep, yak, goats, white bear etc are found near Indo-Nepal borders. Cheetahs living in snow regions are also seen in this region. One horned Rhino in Assam, Indian Bustard in Rajasthan, Red Panda in Sikkim, Nilgai in Darjeeling, and four horned antelope (special species found only in India) and Hoolock Gibbon in Assam are the famous in India. Besides these animals, antelopes, wild bison and wild donkey are also found in India. Hog deer, swamp deer, chital spotted deer, musk deer and Thamin are the types of deer found in India. Besides Lions and Tigers wild panther, Lamchira, snow Chittah, small cats etc are also found. Varieties of Monkeys are also found in India. Langurs, rhesus monkeys, Copihoolock Monkeys (north-eastern India) and long tailed monkeys (southern India). **Tiger** is a National Animal of India. Varieties of colourful birds are seen in India. **Pea-cock** is the national bird of India. Pucupine, hornbill, stork, coalgoose, crow, drake, duck, swan, crane, myna, dove, bater,

dhanesh, owl, eagle, vultures, sparrows, pigeons etc. are the other species found in India.



Python

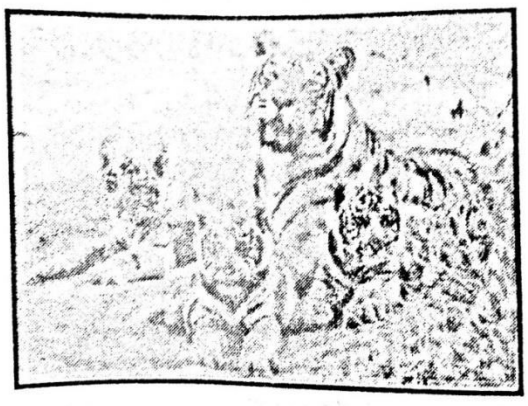
Besides animals and birds, various species of amphibians, reptiles and fish are seen in India. Animals like Crocodiles, Turtles, hippopotamus, comodo dragon etc. who live both in water and on land found in India. Various species of fish found in river, lakes, sea, ponds etc. Every year **Olive Riddle** Turtles migrate to India near the River mouths of Mahanadi (Bhitar Kanika) and Rushikulia for laying eggs. Rare species of Blue crabs are seen in Bhitar Kanika and Coastal areas of Odisha. Dolphins are found in Chilika Lake. Many tourists from various places visit this place every year to see dolphins. Many species of poisonous and non poisonous snakes are found in various places and forests of India. Snakes like Python, Cobra, King Cobra, viper, boa, water snakes etc. are found in India. Apart from these animals, worms, insects, flys, micro-organisms are found.

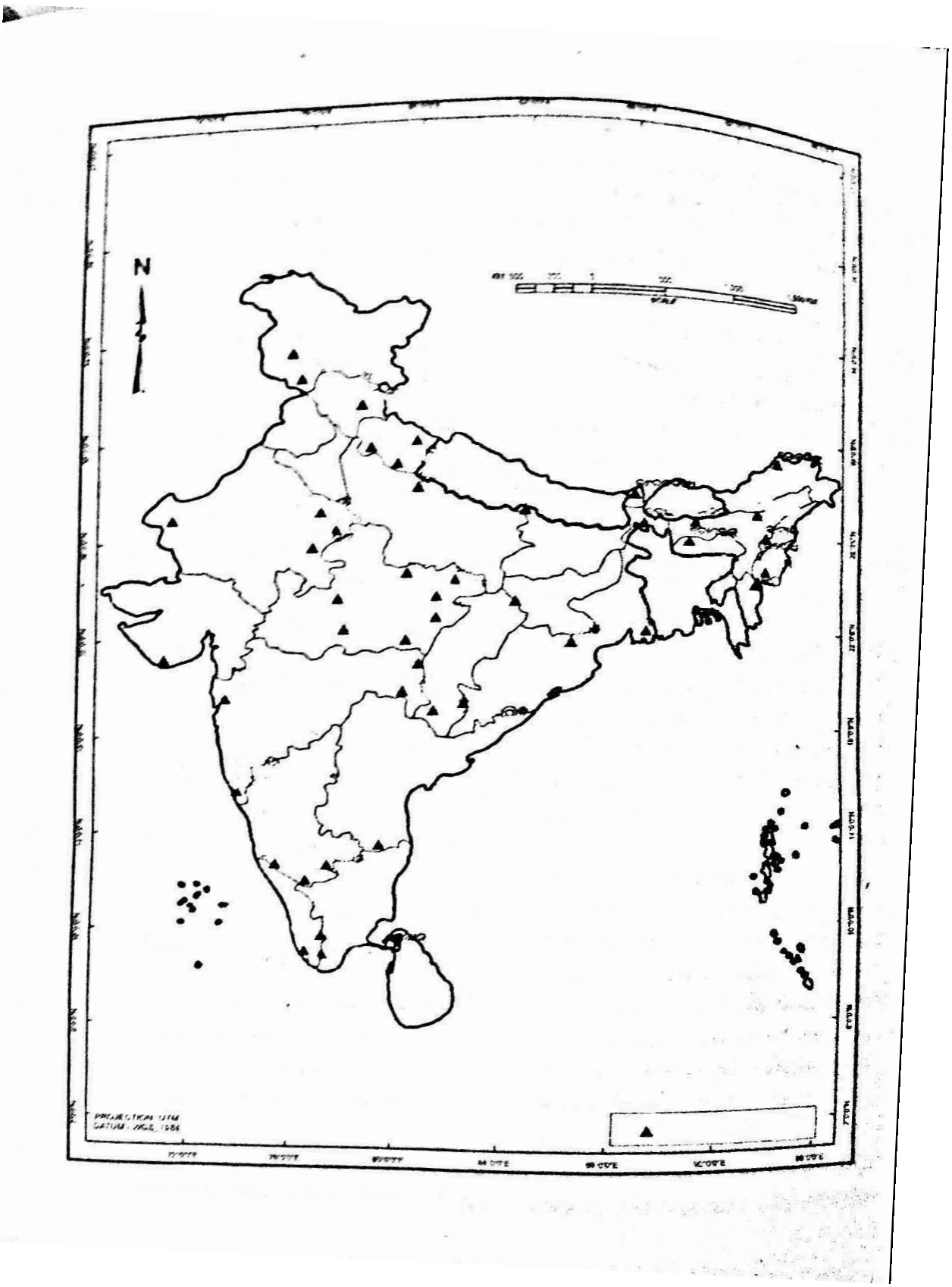
Uses and benefit of Animals

We get milk, meat, horns, leather, wool etc from animals. We get Honey from beehives. Insect take nectar from flowers and few animals help in cleaning and refreshing the environment. Crow, vultures etc they feed on dead animals and human and indirectly clean the environment. Fishing is done in rivers, lakes, ponds etc. Even various important medicines are prepared from some animals.

WILDLIFE CONSERVATION

Increase in population, over-exploitation, environmental pollution, poisonous chemicals like pesticides and insecticides, urbanization, technology and deforestation etc are factors, which have led to the decline in India's biodiversity i.e. decline in wildlife in number and species. Natural calamities like floods, forest fire, earth quake, famine and human factors like poaching, killing animals and cutting plants for medicinal preparation are the other reasons for decline of wildlife. Forest fires occur during the summers burns the forest as well as the wild animals living in it.





The eggs of hens, ducks and turtles are eaten maximum as a result of which their number is also reducing day by day. People poach pea-cocks and using its feather for decoration and various religious functions. People hunt tigers, lions, deer, snakes, crocodiles, elephants etc for their skin, horns, teeth, meat etc. which resulted in decline of wildlife.

The factors which led to the decline of biodiversity are physical change in habitat, transformation, **disintegration** etc; over-population, pollution, intruders, over utilization and hunting, lack of food, indulgence of man in ecological chain. Increase in these factors will lead to the wildlife extinction fast if there is no strategies are taken for conserving these animals. This type species are known as Threatened Species. Since last century onwards maximum animals becoming the Threatened species due to the fast industrialization of the countries made people to think about the conservative measure to be taken to save these threatened species from extinction.

An International organization has taken a responsibility take necessary measures to stop these threatened species to become extinct. International Union for Conservation of Nature and Natural Resources is the name of this international organization whose head office is situated at Morch of Switzerland. Now it is renamed as World Conservation Union. It is also published book on the Threatened animals which called as Red Data Book. It was first published in the year 1966 contained threatened species of about more than 3000 animals and 20,000 plants, out of which most of them are from India. 474 threatened were the flora and more than 100 was the fauna. Out of these threatened animals, 44 species of plants and 113 species of animals become extinct. If a species is not visible for more than 50 years then it is known as an extinct species. Indian Cheetah are now extinct in India but found in Africa. Similarly dinosaurs are now no more on earth, they are extinct. Indian cheetah, Indian Rhino, Pink headed duct, Forest owl and Mountain Quil are extinct in 20^{th} century from India. During this period around 20 species were also extinct.

Due to unsupportive reasons some animals may extinct within short period of time are known as Endangered animals. E.g Wild donkey in Rajasthan, Lion tailed Macaque, Tigers, Vultures etc. Some animals are known as Vulnerable species because even though they are existing but it is predicted that they may reduce in numbers in due course of time i.e. in near future. E.g. some birds and insects they feed on plants where insecticides and pesticides are used to control various diseases. Even the numbers of the antelopes are declining.

Few species are extinct naturally whereas few are seen in limited areas only. These endangered and threatened species are not taken proper care and conserve them properly, they will also become extinct. Now these are called rare species. They are generally attacked by pests, pathogens, predators and exotic species and come under the danger zone. Clouded Leopard found in mountain regions of Himachal Pradesh, Bustards found in deserts of Rajasthan and Gujarat, Golden Langurs of Assam are few examples. To protect the wildlife and environment, Government has passed many Acts. Various laws/Acts were implemented to protect wildlife in India before the implementation of Bio Diversity Act in the year 2002.

Through “Project Tiger” , one of the well publicized wildlife campaign in the world, 27 projects are functioning in 14 states. Manas Tiger Reserve in Assam, Palamu tiger reserve in Jharkhand, Corbett National Park in Uttarakhand, Melghat Tiger reserve in Maharashtra Bandipur in Karnataka, Shimilipal Tiger reserve in Odisha, Sunderbans National Park in West Bengal, Ranthambore National Park in Rajasthan, Sudanthurai in Tamil Nadu, Kanha National park in Madhya Pradesh, Dudhawa in Uttar Pradesh, Periyar Tiger Reserve of Kerala, Nam Japha in Arunachal Pradesh etc are the important Tiger Projects in India.

TABLE	
POPULATION OF VARIOUS SPECIES FOUND IN RED DATA BOOK	
ANIMALS	**NUMBER OF SPECIES**
1. Invertebrates	1355
2. Pieces	343
3. Amphibians	50
4. Reptiles	170
5. Aves	1037
6. Mammals	497

REMEMBER :
People take care of animals more in National Parks than in Sanctuaries. Protection to these animals is highest priority in National Parks. Animal grazing and utilization of land for personal use is strictly prohibited in National Parks.

Important National Parks and Sanctuaries found in India are Dachigram of Jammu and Kashmir (Kashmiri stag, Hangul, Black bear, Musk deer), Corbett National Park in Uttarakhand (Cheetah, deer, elephants, leopard), Manas National Park (elephant, hippo, gorilla, stag, water deer, antelope, bear, ghadial, crocodiles, python, white owl etc), Mudumallai in Tamil Nadu (elephants), Nagarhole in Karnataka (elephants), Wainad and Periyar in Kerala (elephants), Gir in Gujarat (leopard, Chital, Sumbhar, Nilgai, etc), Kaziranga in Assam(Hippo and gorilla), Nam Dafa in Arunachal Pradesh (gaur, gorilla, Gaural, Taikan etc).

Padmaja Naidu Himalayan Animals Park was established in Darjeeling in the year 1966 and Pandas are conserved through Red Panda Project. Similarly for Hippos, Kaziranga National Park and for Tigers, Gir National Park in Gujarat, for elephants, Chandaka Sanctuary in Odisha are famous in India.

PROTECTED AREA OF BIOSPHERE
Earth has to be kept in natural form in order to protect the plants and animals.

Like wildlife, various measures are taken to protect birds from poaching by establishing bird sanctuaries to conserve various species of birds and their natural habitats. Chilika in Odisha, Ranthambhor in Rajasthan, Bedantangul and Kalimar in Tamil Nadu are few famous bird sanctuaries in India. Project Crocodile is established to protect and conserve crocodiles in Bhitarkanika and Tikarpara of Odisha. Similarly, various steps and measures are taken to protect Olive Riddle Turtles and Blue crabs near the river mouths of Bhitarkanika and Rushikulya. Project Crocodiles are also functioning in various other states like Rajasthan, West Bengal, Tamil Nadu, Andhra Pradesh, Gujarat, Kerala, Madhya Pradesh, Bihar, Andaman and Nicobar islands and Nagaland.

Peoples' cooperation is very much required besides the implementation of various projects to conserve forests, wildlife and for maintaining environment balance. For this :

1. Accepting steps taken to control the wildlife trade and exploitation.
2. Increasing the population of the threatened animals by using modern means of reproduction or artificial reproduction.
3. Veterinary Hospitals are to be established near the natural habitat of the animals for their treatment of the animals who are suffering.

If the above mentioned steps are followed, we can conserve wildlife as well as maintain the environmental balance.

WORK FOR YOU :

1.List the wild animals found in your region.

2.List the various forest (wild) animals and birds found nearby your surroundings.

EXERCISE

ANSWER THE FOLLOWING QUESTIONS

1. What is Biodiversity?
2. What is Red Data Book?
3. Who are known as Threatened species?
4. What is the function of Wildlife Board?

DIFFERENTIATE BETWEEN

1. Decomposers and Heterotropes

ANSWER THE FOLLOWING QUESTIONS IN ONE LINE

1. Sanctuaries
2. National parks
3. Extinct species
4. Endangered Species

UNIT III

Water as a resource

We have experienced the destruction of flood and furiousness of draught. Efficiency of water causes flood and deficiency of water causes draught. So both the efficiency and deficiency is harmful for the mankind. Water gives life also same water takes life. Water is necessary for the daily household chores like cooking, washing, bathing etc. In industries water is used as a coolant for cooling the machineries.The electricity we are using those are produced from the hydro-electricity. Now you can understand that early human why choose to make their shelter near the river.Along with river the human civilization also flourished near stream, pond, and oasis.

DO YOU KNOW – place where the rainfall is scantily available called deserts. But in deserts also, some places where we find water seepage. Palm trees and some shrubs grow near these areas. People also start living nearby these areas. This is just like an island found surround by water in all side, here the water is surrounded by desert sand (land) called desert island. Bajra and Wheat is cultivated here. Palm trees are grown more as a result it is a staple food item of the tribes living in desert areas.

As you know, around three fourth part of earth is covered by water, but only a small portion of it is sweet water which can be used directly. This sweet water can be obtained from flowing water on earth crust and ground water. It is renewed and recharged by the water-cycle continuously. The water has to go through the water-cycle. So the water is termed as unlimited resource.

You may be surprised to know, if the three fourth part of earth is covered by water and water is an unlimited resource then why water shortage is a major concern in many countries and regions? Why is it said that about 200 crore people will face the scarcity of water during 2025?

Water: Some facts and figures

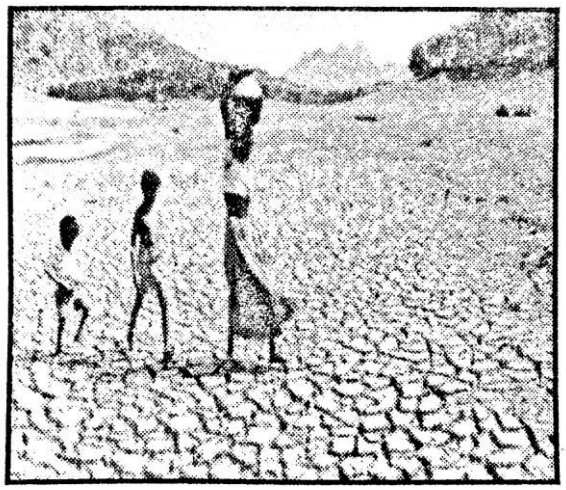
• 96.5 per cent of the total volume of world's water is estimated to exist as oceans and only 2.5 per cent as freshwater. Nearly 70 per cent of this freshwater occurs as ice sheets and glaciers in Antarctica, Greenland and the mountainous regions of the world, while a little less than 30 per cent is stored as groundwater in the world's aquifers.

• India receives nearly 4 per cent of the global precipitation and ranks 133 in the world in terms of water availability per person per annum.

• The total renewable water resources of India are estimated at 1,897 sq km per annum.

• By 2025, it is predicted that large parts of India will join countries or regions having absolute water scarcity.

Source: *The UN World Water Development - Report, 2003*



Water Scarcity

(According to Falken Mark, a Swedish expert, water stress occurs when water availability is less than 1,000 to 1600 cubic metre per person per day.)

WATER SCARCITY AND THE NEED FOR WATER CONSERVATION AND MANAGEMENT

Water is an unlimited resource and sufficiently available. It is also true that due to the uncertainty of rain as per season and less rainfall lead to scarcity of water. True, the availability of water resources varies over space and time, mainly due to the variations in seasonal and annual precipitation, but water scarcity in most cases is caused by over- exploitation, excessive use and unequal access to water among different social groups.

Where is then water scarcity likely to occur? As you have read in the hydrological cycle, freshwater can be obtained directly from precipitation, surface run off and groundwater. Is it possible that an area or region may have ample water resources but is still facing water scarcity? Many of our cities are such examples. Thus, water scarcity may be an outcome of large and growing population and consequent greater demands for water, and unequal access to it. A large population means more water not only for domestic use but also
to produce more food. Hence, to facilitate higher food-grain production, water resources are being over-exploited to expand irrigated areas and dry-season agriculture. You may have seen in many television advertisements that most farmers have their own wells and tube-wells in their farms for irrigation to
increase their produce. But have you ever wondered what this could result in? That it may lead to falling groundwater levels, adversely affecting water availability and food security of the people. Post-independent India witnessed intensive industrialisation and urbanisation, creating vast opportunities for us. Today, large industrial houses are as common place as the industrial units of many MNCs (Multinational Corporations). The ever increasing number of industries has made matters worse by exerting pressure on existing freshwater resources. Industries, apart from being

heavy users of water, also require power to run them. Much of this energy comes from hydroelectric power. Today, in India hydroeclectric power contributes approximately 22 per cent of the total electricity produced. Moreover, multiplying urban centres with large and dense populations and urban lifestyles have not only added to water and energy requirements but have further aggravated the problem. If you look into the housing societies or colonies in the cities, you would find that most of these have their own groundwater pumping devices to meet their water needs. Not surprisingly, we find that fragile water resources are being overexploited and have caused their depletion in several of these cities. So far we have focused on the quantitative aspects of water scarcity. Now, let us consider another situation where water is sufficiently available to meet the needs of the people, but, the area still suffers from water scarcity. This scarcity may be due to bad quality of water. Lately, there has been a growing concern that even if there is ample water to meet the needs of the people, much of it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilizers used in agriculture, thus, making it hazardous for human use.

DO YOU KNOW - India's rivers, especially the smaller ones, have all turned into toxic streams. And even the big ones like the Ganga and Yamuna are far from being pure. The assault on India's rivers – from population growth, agricultural modernisation, urbanisation and industrialisation – is enormous and growing by the day….. This entire life stands threatened.
Source: *The Citizens' Fifth Report, CSE, 1999.*

You may have already realised that the need of the hour is to conserve and manage our water resources, to safeguard ourselves from health hazards, to ensure food security, continuation of our livelihoods and productive activities and also to prevent degradation of our natural ecosystems. Over exploitation and mismanagement of water resources will impoverish this resource and cause ecological crisis that may have profound impact on our lives.

Work for You - From your everyday experiences, write a short proposal on how you can conserve water.

MULTI-PURPOSE RIVER PROJECTS AND INTEGRATED WATER RESOURCES MANAGEMENT

But, how do we conserve and manage water? Archaeological and historical records show that from ancient times we have been constructing sophisticated hydraulic structures like dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation. Not surprisingly, we have continued this tradition in modern India by building dams in most of our river basins. What are dams and how do they help us in conserving and managing water? Dams were traditionally built to impound rivers and rainwater that could be used later to irrigate agricultural fields. Today, dams are built not just for irrigation but for electricity generation, water supply for domestic and industrial uses, flood control, recreation, inland navigation and fish breeding. Hence, dams are now referred to as multi-purpose projects where the many uses of the impounded water are integrated with one another. For example, in the Sutluj-Beas river basin, the Bhakra – Nangal project water is being used both for hydel power production and irrigation. Similarly, the Hirakud project in the Mahanadi basin integrates conservation of water with flood control.

Hydraulic Structures in Ancient India

• In the first century B.C., Sringaverapura near Allahabad had sophisticated water harvesting system channelling the flood water of the river Ganga. • During the time of Chandragupta Maurya,
dams, lakes and irrigation systems were extensively built.

• Evidences of sophisticated irrigation works have also been found in Kalinga, (Orissa), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), Kolhapur (Maharashtra), etc.

• In the 11th Century, Bhopal Lake, one of the largest artificial lakes of its time was built.

• In the 14th Century, the tank in Hauz Khas, Delhi was constructed by Iltutmish for supplying water to Siri Fort area.

Source: *Dying Wisdom, CSE, 1997.*

A **dam** is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir, lake or impoundment. "Dam" refers to the reservoir rather than the structure. Most dams have a section called a spillway or weir over which or through which it is intended that water will flow either intermittently or continuously. Dams are classified according to structure, intended
purpose or height. Based on structure and the materials used, dams are classified as timber dams, embankment dams or masonry dams, with several subtypes. According to the height, dams can be categorised as large dams and major dams or alternatively as low dams, medium height dams and high dams.

Multi-purpose projects, launched after Independence with their integrated water resources management approach, were thought of as the vehicle that would lead the nation to development and progress,
overcoming the handicap of its colonial past. Jawaharlal Nehru proudly proclaimed the dams as the 'temples of modern India'; the reason being that it would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

WORK FOR YOU - Find out more about any one traditional method of building dams and irrigation works.

In recent years, multi-purpose projects and large dams have come under great scrutiny and opposition for a variety of reasons. Regulating and damming of rivers affect their natural flow causing poor sediment flow and excessive sedimentation at the bottom of the reservoir, resulting in rockier stream beds and poorer habitats for the rivers' aquatic life. Dams also fragment rivers making it difficult for aquatic fauna to migrate, especially for spawning. The reservoirs that are created on the floodplains also submerge the existing vegetation and soil leading to its decomposition over a period of time. Multi-purpose projects and large dams have also been the cause of many new social movements like the 'Narmada Bachao Andolan'

and the 'Tehri Dam Andolan' etc. Resistance to these projects has primarily been due to the large-scale displacement of local communities. Local people often had to give up their land, livelihood and their meagre access and control over resources for the greater good of the nation. So, if the local people are not benefiting
from such projects then who is benefited? Perhaps, the landowners and large farmers, industrialists and few urban centres. Take the case of the landless in a village – does he really gain from such a project?

Narmada Bachao Andolan or Save Narmada Movement is a Non Governmental Organisation (NGO) that mobilised tribal people, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam being built across the Narmada river in Gujarat. It originally focused on the environmental issues related to trees that would be submerged under the dam
water. Recently it has re-focused the aim to enable poor citizens, especially the oustees (displaced people) to get full rehabilitation facilities from the government.People felt that their suffering would not be in vain… accepted the trauma of displacement believing in the promise of irrigated fields and plentiful harvests. So, often the survivors of Rihand told us that they accepted their sufferings as sacrifice for the sake of their nation. But now, after thirty bitter years of being adrift, their livelihood having even being more precarious, they keep asking: "Are we the only ones chosen to
make sacrifices for the nation?"

Source: *S. Sharma, quoted in In the Belly of the River. Tribal conflicts over development in Narmada valley, A. Baviskar, 1995.*

Irrigation has also changed the cropping pattern of many regions with farmers shifting to water intensive and commercial crops. This has great ecological consequences like salinisation of the soil. At the same time, it has transformed the social landscape i.e. increasing the social gap between the richer landowners and the landless poor. As we can see, the dams did create conflicts between people wanting different uses and benefits from the same water resources. In Gujarat, the Sabarmati-basin farmers were agitated and almost caused a riot over the higher priority given to water supply in urban areas, particularly during droughts. Inter-state water disputes are also becoming common with regard to sharing the costs and benefits of the multi-purpose project.

Do you know - the Krishna-Godavari dispute is due to the objections raised by Karnataka and Andhra Pradesh governments? It is regarding the diversion of more water at Koyna by the Maharashtra government for a multipurpose project. This would reduce downstream flow in their states with adverse consequences for
agriculture and industry.

Most of the objections to the projects arose due to their failure to achieve the purposes for which they were built. Ironically, the dams that were constructed to control floods have triggered floods due to sedimentation in the reservoir. Moreover, the big dams have mostly been unsuccessful in controlling floods at the time of excessive rainfall. You may have seen or read how the release of water from dams during heavy rains aggravated the flood situation in Maharashtra and Gujarat in 2006. The floods have not

only devastated life and property but also caused extensive soil erosion. Sedimentation also meant that the flood plains
were deprived of silt, a natural fertiliser, further adding on to the problem of land degradation. It was also observed that the multi-purpose projects induced earthquakes, caused waterborne diseases and pests and pollution resulting from excessive use of water.

WORK FOR YOU - Make a list of inter-state water disputes.

RAINWATER HARVESTING

Many thought that given the disadvantages and rising resistance against the multi- purpose projects, water harvesting system was a viable alternative,

both socioeconomically and environmentally. In ancient India, along with the sophisticated hydraulic structures, there existed an extraordinary tradition of water-harvesting system. People had in-depth knowledge of rainfall regimes and soil types and developed wide ranging techniques to harvest rainwater, groundwater, river water and flood water in keeping with the local ecological conditions and their water needs. In hill and mountainous regions, people built diversion channels like the 'guls'or 'kuls' of the Western Himalayas for agriculture. 'Rooftop rain water harvesting' was commonly practised to store drinking water, particularly in Rajasthan. In the flood plains of Bengal, people developed inundation channels to irrigate their fields. In arid and semi-arid regions, agricultural fields were converted into rain fed storage structures that allowed the water to stand and moisten the soil like the 'khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

WORK FOR YOU - Find out other rainwater harvesting systems existing in and around your locality.

In the semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer, almost all the houses traditionally had underground tanks or *tankas* for storing drinking water. The tanks could be as large as a big room; one household in Phalodi had a tank that was 6.1 metres deep, 4.27 metres long and 2.44 metres wide. The tankas were part of the well-developed rooftop rainwater harvesting system and were built inside the main house or the courtyard. They were connected to the sloping roofs of the houses through a pipe. Rain falling on the rooftops would travel down the pipe and was stored in these underground 'tankas'. The first spell of rain was usually not collected as this would clean the roofs and the pipes. The rainwater from the subsequent showers was then collected. The rainwater can be stored in the **tankas** till the next rainfall making it an extremely reliable source of drinking water when all other sources are dried up, particularly in the summers. Rainwater, or **palar pani**, as commonly referred to in these parts, is considered the purest form of natural water.

Many houses constructed underground rooms adjoining the 'tanka' to beat the summer heat as it would keep the room cool.

Interesting Facts - Tamil Nadu is the first and the only state in India which has made roof top rainwater harvesting structure compulsory to all the houses across the state. There are legal provisions to punish the defaulters.

Today, in western Rajasthan, sadly the practice of rooftop rainwater harvesting is on the decline as plenty of water is available due to the perennial Rajasthan Canal, though some houses still maintain the tankas since they do not like the taste of tap water. Fortunately, in many parts of rural and urban India, rooftop rainwater
harvesting is being successfully adapted to store and conserve water. In Gendathur, a remote backward village in Mysore, Karnataka, villagers have installed, in their household's rooftop, rainwater harvesting system to meet their water needs. Nearly 200 households have installed this system and the village has earned the rare distinction of being rich in rainwater.

WORK FOR YOU - Find out other rainwater harvesting systems existing in and around your locality.

BAMBOO DRIP IRRIGATION SYSTEM

In Meghalaya, a 200-year-old system of tapping stream and spring wate by using bamboo pipes, is prevalent. About 18-20 litres of water enters the bamboo pipe system, gets transported over hundreds of metres, and finally reduces to 20-80 drops per minute ate the site of the plant.

Picture 1 Picture 2 Picture 3

Picture 1: Bamboo pipes are used to divert perennial springs on the hilltops to the lower reaches by gravity.

Picture 2 and 3: The channel sections, made of bamboo, divert water to the plant site where it is distributed into branches, again made and laid out with different forms of bamboo pipes. The flow of water into the pipes is controlled by manipulating the pipe positions.

Picture 4 Picture 5 Picture 6

Picture 4: If the pipes pass a road, they are taken high above the land.

Picture 5 and 6 Reduced channel sections and diversion units are used at the last stage of water application. The last channel section enables water to be dropped near the roots of the plant.

Interesting facts: Roof top rain water harvesting is the most common practice in Shillong, Meghalaya. It is interesting because Cherapunjee and Mawsynram situated at a distance of 55 km. from Shillong receive the highest rainfall in the world, yet the state capital Shillong faces acute shortage of water.
Nearly every household in the city has aroof top rain water harvesting structure. Nearly 15-25 per cent of the total water requirement of the household comes from roof top water harvesting.

WORK FOR YOU –

1. Collect information on how industries are polluting our water resources.
2. Enact with your classmates a scene of water dispute in your locality.

Exercise

1-Answer the following

(i) Mention the following area as whether they have water surplus and water scarcity

(a)Area witness heavy amount of rain fall in a year.

(b)Area having low population density but witness a high rain fall in a year.

(c)Rain fall is high trough out year but highly polluted.

(d)Area having water scarcity as well as witness low rain.

(ii) Find out the statement which is not suitable for multipurpose Dam

(a)Multipurpose Dams provide water to the area having water scarcity.
(b)Multipurpose Dam controls the flood water.
(c)Multipurpose Dams forces people to leave their home
(d)Multipurpose Dams provides electricity to the use of industries and domestic use.

(iii)These are following statement having some errors, find them and correct them.

(a)The growth of population in highly populated areas and urban life style is helping in water management.

(b)The natural flow and deposition of a river does not get affected by setting a dam on it.

(c)The people are staying near the river of Sabarmati did not complain while proving it's water to urban areas during draught.

(d)Even Rajasthan is getting sufficient amount of water through canal facility still water harvesting facility is very popular there.

(2)Answer the following in around 30 words

(a)How water is known unlimited resource, explain.

(b)What is water scarcity and which factors are responsible for it?

(c) What are the advantages and disadvantages of multipurpose Dam and give a comparative explanatory note on it?

(3)Answer the following in 120 words.

(a)Discuss about water harvesting processes found in semi dry (arid) regions of Rajasthan.

(b)How traditional water harvesting system is helpfull in collection and storage of water?

(4)Point out the Multipurpose Dams and name the river found in the states of Maharashtra, Odisha, Gujarat, Andhra Pradesh, Tamilnadu, and Madhya Pradesh in India Outline Map.

UNIT IV

Mineral resources

We use different things in our daily life made from metal. Can you list a number of items used in your house made of metals. Where do these metals come from? You have studied that the earth's crust is made up of different minerals embedded in the rocks. Various metals are extracted from these minerals after proper refinement. Minerals are an indispensable part of our lives. Almost everything we use, from a tiny pin to a towering building or a big ship, all are made from minerals. The railway lines and the tarmac (paving) of the roads, our implements and machinery too are made from minerals. Cars, buses, trains, aeroplanes are manufactured from minerals and run on power resources derived from the earth. Even the food that we eat contains minerals. In all stages of development, human beings have used minerals for their livelihood, decoration, festivities, religious and ceremonial rites. The various ages of human development is based on the names of the minerals like Iron age, copper age, bronze age etc.

A bright smile from toothpaste and minerals

Toothpaste cleans your teeth. Abrasive minerals like silica, limestone, aluminium oxide and various phosphate minerals do the cleaning. Fluoride which is used to reduce cavities, comes from a mineral fluorite. Most toothpaste are made white with titanium oxide, which comes from minerals called rutile, ilmenite and anatase. The sparkle in some toothpastes comes from mica. The toothbrush and tube containing the paste are made of plastics from petroleum. Find out where these minerals are found?

WORK FOR YOU find out how many minerals are used to make a light bulb?

All living things need minerals

Life processes cannot occur without minerals. Although our mineral intake represents only about 0.3 per cent of our total intake of nutrients, they are so potent and so important that without them we would not be able to utilise the other 99.7 per cent of foodstuffs.

What is a mineral?

Geologists define mineral as a "homogenous, naturally occurring substance with a definable internal structure." Minerals are found in varied forms in nature, ranging from the hardest diamond to the softest talc.

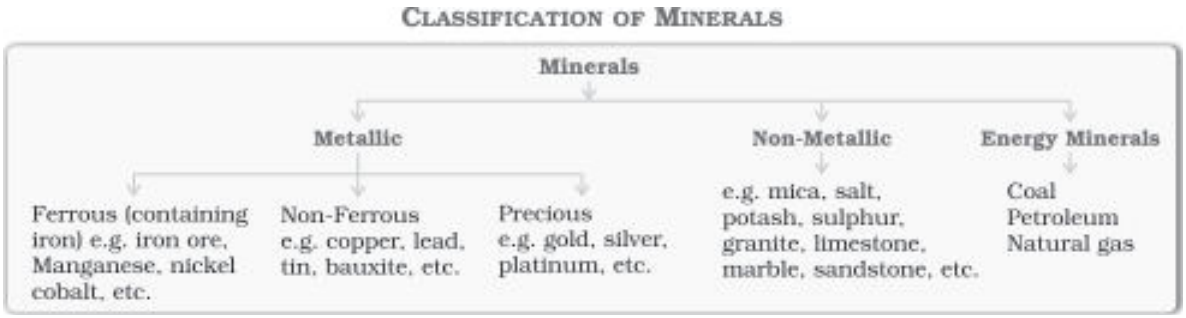
Why are they so varied? You have already learnt about rocks. Rocks are combinations of homogenous substances called **minerals**. Some rocks, for instance limestone, consist of a single mineral only, but majority of the rock consist of several minerals in varying proportions. Although, over 2000 minerals have been identified, only a few are abundantly found in most of the rocks. A particular mineral that will be formed from a certain combination of elements depends upon the physical and chemical conditions under which the material forms. This, in turn, results in a wide

range of colours, hardness, crystal forms, lustre and density that a particular mineral possesses. Geologists use these properties to classify the minerals.

Study of Minerals by Geographers and Geologists

Geographers study minerals as part of the earth's crust for a better understanding of landforms. The distribution of mineral resources and associated economic activities are of interest to geographers. A geologist, however, is interested in the formation of minerals, their age and physical and chemical composition.

However, for general and commercial purposes minerals can be classified as under.



MODE OF OCCURRENCE OF MINERALS

Where are these minerals found? Minerals are usually found in "ores". The term ore is used to describe an accumulation of any mineral mixed with other elements. The mineral content of the ore must be in sufficient concentration to make its extraction commercially viable. The type of formation or structure in which they are found determines the relative ease with which mineral ores may be mined. This also determines the cost of extraction. It is, therefore, important for us to understand the main types of formations in which minerals occur. Minerals generally occur in these forms:

(i) In igneous and metamorphic rocks minerals may occur in the cracks, crevices, faults or joints. The smaller occurrences are called veins and the larger are called lodes. In most cases, they are formed when minerals in liquid/ molten and gaseous forms are forced upward through cavities towards the
earth's surface. They cool and solidify as they rise. Major metallic minerals like tin, copper, zinc and lead etc. are obtained from veins and lodes.

(ii) In sedimentary rocks a number of minerals occur in beds or layers. They have been formed as a result of deposition, accumulation and concentration in horizontal strata. Coal and some forms of
iron ore have been concentrated as a result of long periods under great heat and pressure. Another group of sedimentary minerals include gypsum, potash salt and sodium salt. These are formed as a result of evaporation especially in arid regions.

(iii) Another mode of formation involves the decomposition of surface rocks, and the removal of soluble constituents, leaving a residual mass of weathered material containing ores. Bauxite is formed this way.

(iv) Certain minerals may occur as **alluvial deposits** in sands of valley floors and the base of hills. These deposits are called 'placer deposits' and generally contain minerals, which are not corroded by water.
Gold, silver, tin and platinum are most important among such minerals.

(v) The ocean waters contain vast quantities of minerals, but most of these are too widely diffused to be of economic significance. However, common salt, magnesium and bromine are largely derived from ocean waters. The ocean beds, too, are rich in manganese nodules.

India is fortunate to have fairly rich and varied mineral resources. However, these are unevenly distributed. Broadly speaking, peninsular rocks contain most of the reserves of coal, metallic minerals, mica and many other non-metallic minerals. Sedimentary rocks on the western and eastern flanks of the peninsula, in Gujarat and Assam have most of the petroleum deposits. Rajasthan with the rock systems of the peninsula, has reserves of many non-ferrous minerals. The vast alluvial plains of north India are almost devoid of economic minerals. These variations exist largely because of the differences in the geological structure, processes and time involved in the formation of minerals. Let us now study the distribution of a few major minerals in India. Always remember that the concentration of mineral in the ore, the ease of extraction and closeness to the market play an important role in affecting the economic viability of a reserve. Thus, to meet the demand, a choice has to be made between a number of possible options. When this is done a mineral 'deposit' or 'reserve' turns into a **mine**.

INTERESTING FACTS
Rat-Hole Mining. Do you know that most of the minerals in India are nationalized and their extraction is possible only after obtaining due permission from the government? But in most of the tribal areas of the north-east India, minerals are owned by individuals or communities. In Meghalaya, there are large deposits of coal, iron ore, limestone and dolomite etc. Coal mining in Jowai and Cherapunjee is done by family member in the form of a long narrow tunnel, known as 'Rat hole' mining.

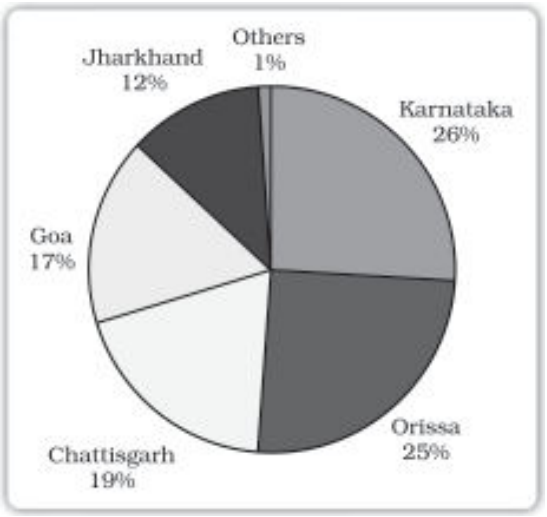
Ferrous Minerals

Ferrous minerals account for about three fourths of the total value of the production of metallic minerals. They provide a strong base for the development of metallurgical industries. India exports substantial quantities of ferrous minerals after meeting her internal demands.

Iron Ore

Iron ore is the basic mineral and the backbone of industrial development. India is endowed with fairly abundant resources of iron ore. India is rich in

good quality iron ores. Magnetite is the finest iron ore with a very high content of iron up to 70 per cent. It has excellent magnetic qualities, especially valuable in the electrical industry. Hematite ore is the most important industrial iron ore in terms of the quantity
used, but has a slightly lower iron content than magnetite. (50-60 per cent).



WORK FOR YOU - Kudre in Kannada means horse. The highest peak in the western ghats of Karnataka resembles the face of a horse. The Bailadila hills look like the hump of an ox, and hence its name.

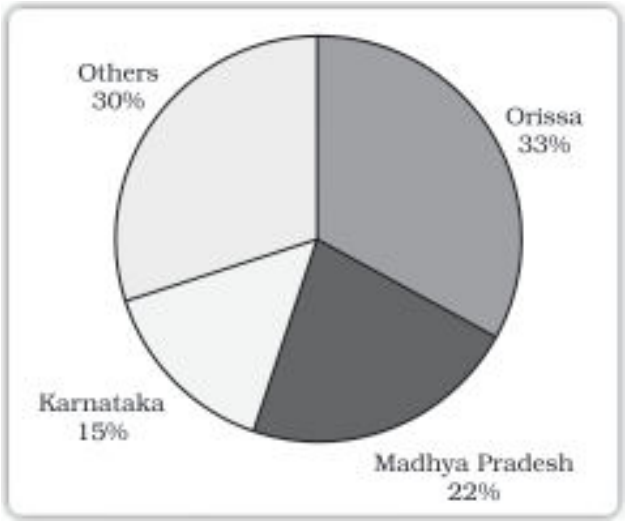
The major iron ore belts in India are:
• *Orissa-Jharkhand belt*: In Orissa high grade hematite ore is found in Badampahar mines in the Mayurbhanj and Kendujhar districts. In the adjoining Singbhum district of Jharkhand haematite iron ore is
mined in Gua and Noamundi.

• *Durg-Bastar-Chandrapur belt* lies in Chhattisgarh and Maharashtra. Very high grade hematites are found in the famous Bailadila range of hills in the Bastar district of Chattisgarh. The range of hills comprise of 14 deposits of super high grade hematite iron ore. It has the best physical properties needed for steel making. Iron ore from these mines is exported to Japan and South Korea via Vishakapatnam port.

• *Bellary-Chitradurga-Chikmaglur-Tumkur belt* in Karnataka has large reserves of iron ore. The Kudermukh mines located in the Western Ghats of Karnataka are a 100 percent export unit. Kudremukh deposits are known to be one of the largest in the world. The ore is transported as slurry through a pipeline to a port near Mangalore.
• *Maharashtra-Goa belt* includes the state of Goa and Ratnagiri district of Maharashtra. Though, the ores are not of very high quality, yet they are efficiently exploited. Iron ore is exported through Marmagao port.

Manganese

Manganese is mainly used in the manufacturing of steel and ferro-manganese alloy. Nearly 10 kg of manganese is required to manufacture one tonne of steel. It is also used in manufacturing bleaching powder, insecticides and paints. Orissa is the largest producer of manganese ores in India. It accounted for one-third of the country's total production in 2000-01.



Production of Manganese showing statewise share in per cent, 2003-2004

WORK FOR YOU : Superimpose the maps showing distribution of iron ore, manganese, coal and iron and steel industry. Do you see any correlation. Why?

Non-Ferrous Minerals

India's reserves and production of non- ferrous minerals is not very satisfactory. However, these minerals, which include copper, bauxite, lead, zinc and gold play a vital role in a number of metallurgical, engineering and electrical industries. Let us study the distribution of copper and bauxite.

India is critically deficient in the reserve and production of copper. Being malleable, ductile and a good conductor, copper is mainly used in electrical cables, electronics and chemical industries. The Balaghat mines in Madhya Pradesh produce 52 per cent of India's copper. The Singbhum district of Jharkhand is also a leading producer of copper. The Khetri mines in Rajasthan are also famous.

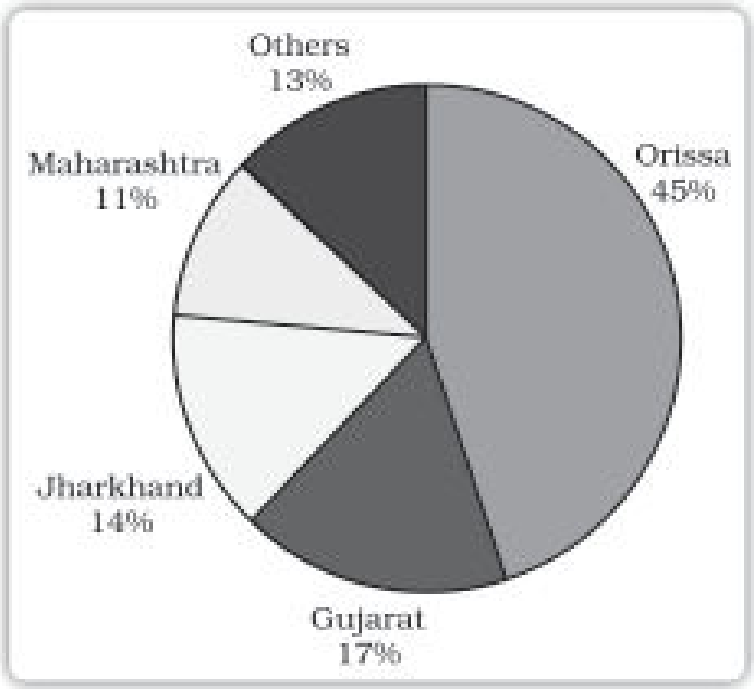
Bauxite

Though, several ores contain aluminium, it is from bauxite, a clay-like substance that alumina and later aluminium is obtained. Bauxite deposits are formed by the decomposition of a wide variety of rocks rich in aluminium silicates. Aluminium is an important metal because it combines the strength of metals such as iron, with extreme lightness and also with good conductivity and great malleability. India's bauxite deposits are mainly found in te Amarkantak plateau, Maikal hills and the plateau region of

Bilaspur- Katni. Orissa is the largest bauxite producing state in India with 45 per cent of the country's total production in 2000-01. Panchpatmali deposits in Koraput district are the most important bauxite deposits in the state.

WORK FOR YOU Locate the mines of Bauxite on the physical map of India.

INTERESTING FACT - After the discovery of aluminium Emperor NapoleonIII wore buttons and hooks on his clothes made of aluminium and served food to his more illustrious guests in aluminium utensils and the less honourable ones were served in gold and silver utensils. Thirty years after this incident aluminium bowls were most common with the beggars in Paris.

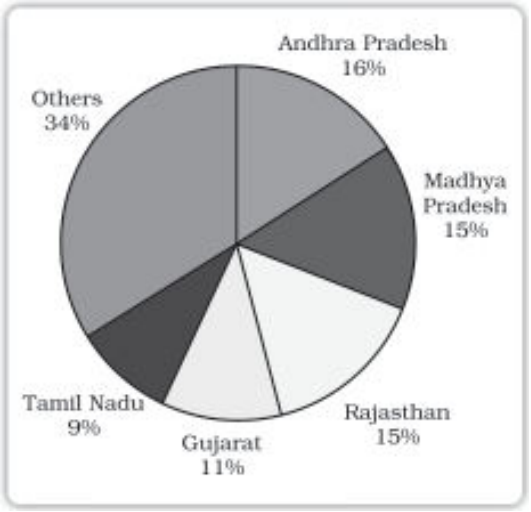


Production of Bauxite showing state-wise share in per cent, 2003-04

Non-Metallic Minerals

Mica is a mineral made up of a series of plates or leaves. It splits easily into thin sheets. These sheets can be so thin that a thousand can be layered into a mica sheet of a few centimeters high. Mica can be clear, black, green, red yellow or brown. Due to its excellent di-electric strength, low power loss factor, insulating properties and resistance to high voltage, mica is one of the most indispensable minerals used in electric and electronic industries. Mica deposits are found in the northern edge of the Chota Nagpur plateau. Koderma Gaya – Hazaribagh belt of Jharkhand is the leading producer. In

Rajasthan, the major mica producing area is around Ajmer. Nellore mica belt of Andhra Pradesh is also an important producer in the country.



Production of Limestone showing statewise share in per cent, 2003-04

Rock Minerals

Limestone is found in association with rocks composed of calcium carbonates or calcium and magnesium carbonates. It is found in sedimentary rocks of most geological formations. Limestone is the basic raw material for the cement industry and essential for smelting iron ore in the blast furnace.

Hazards of Mining

Have you ever wondered about the efforts the miners make in making life comfortable for you? What are the impacts of mining on the health of the miners and the environment? The dust and noxious fumes inhaled by miners make them vulnerable to pulmonary diseases. The risk of collapsing mine roofs, inundation and fires in coalmines are a constant threat to miners. The water sources in the region get contaminated due to mining. Dumping of waste and slurry leads to degradation of land, soil, and increase in stream and river pollution. Stricter safety regulations and implementation of environmental laws are essential to prevent mining from becoming a "killer industry".

CONSERVATION OF MINERALS

We all appreciate the strong dependence of industry and agriculture upon mineral deposits and the substances manufactured from them. The total volume of workable mineral deposits is an insignificant fraction i.e. one per cent of the earth's crust. We are rapidly consuming mineral resources that required millions of years to be created and concentrated. The geological processes of mineral formation are so slow that the rates of replenishment are infinitely small in comparison to the present rates of consumption. Mineral resources are, therefore, finite and non-renewable. Rich mineral deposits are our country's extremely valuable but short-lived possessions. Continued extraction of ores leads to increasing costs as mineral extraction

comes from greater depths along with decrease in quality. A concerted effort has to be made in order to use our mineral resources in a planned and sustainable manner. Improved technologies need to be constantly evolved to allow use of low grade ores at low costs. Recycling of metals, using scrap metals and other substitutes are steps in conserving our mineral resources for the future.

WORK FOR YOU : Make a list of items where substitutes are being used instead of minerals.
Where are these substitutes obtained from?

Exercise

1-Choose the correct answer.

(i) Which ore mineral from following is formed by the sedimentary deposit?
(a) Coal (b)Bauxite (c) Gold (d) Zinc

(ii) Which one of the following ore mineral is extracted from the Koderma of Jharakhanda in large quantity?
(a) Bauxite (b) Iron ore (c) cooper (d) Mica

(iii) In which rock the minerals get deposit in layers?
(a) Igneous rock (b) sedimentary rock (c) metamorphic rock (d) none of these.

(iv) Which mineral is available like placer deposit?
(a)zinc (b) silver (c) gypsum (d) Magnesium

2- Answer the following in 30 words.

(i) What is the difference between the ferrous and non ferrous minerals?

(ii) What do mean by minerals?

(iii) How are the minerals formed from igneous rock and metamorphic rock?

(iv) Why is the conservation of minerals important?

3- Answer the following questions in the 120 words.

(i) Give an account of iron ore deposit in India.

(ii) Discuss about the requirement for conservation of minerals and various methods of conservation.

4- Join the A group and B group.

A	B
Non ferrous	Bauxite
Raw material for cement industry	Gypsum
Aluminum	copper
Extracted at Khetri	Mica
Formed by evaporation	Limestone
	Manganese

UNIT V

Energy Resources

Energy is required for all activities. It is needed to cook, to provide light and heat, to propel vehicles and to drive machinery in industries. Energy can be generated from fuel minerals like coal, petroleum, natural gas, uranium and from electricity.

Energy resources can be classified as

1. conventional and
2. nonconventional sources.

Conventional sources include: firewood, cattle dung cake, coal, petroleum, natural gas and electricity (both hydel and thermal).

Non-conventional sources include solar, wind, tidal, geothermal, biogas and atomic energy. Firewood and cattle dung cake are most common in rural India. According to one estimate more than 70 per cent energy requirement in rural households is met by these two ; continuation of these is increasingly becoming difficult due to decreasing forest area. Moreover, using dung cake too is being discouraged because it consumes most valuable manure which could be used in agriculture.

Conventional Sources of Energy

Coal: In India, coal is the most abundantly available fossil fuel. It provides a substantial part of the nation's energy needs. It is used for power generation, to supply energy to industry as well as for domestic needs. India is highly dependent on coal for meeting its commercial energy requirements. As you are already aware that coal is formed due the compression of plant material over millions of years. Coal, therefore, is found in a variety of forms depending on the degrees of compression and the depth and time of burial.

Decaying plants in swamps produce **peat**. Which has a low carbon (less than 50%) and high moisture contents and low heating capacity. **Lignite** is a low grade brown coal, which is soft with high moisture content containing nearly 60% carbon. The principal lignite reserves are in Neyveli in Tamil Nadu and are used for generation of electricity. Coal that has been buried deep and subjected to increased temperatures is **bituminous** coal. It is the most popular coal in commercial use as it contains 60-80 percent of Carbon. Metallurgical coal is high grade bituminous coal which has a special value for smelting iron in blast furnaces. **Anthracite** is the highest quality hard coal contains 90-95% of carbon.

In India coal occurs in rock series of two main geological ages, namely Gondwana, a little over 200 million years in age and in tertiary deposits which

are only about 55 million years old. The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley (West Bengal-Jharkhand). Jharia, Raniganj, Bokaro are important coalfields. The Godavari, Mahanadi, Son and Wardha valleys also contain coal deposits. Tertiary coals occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

Remember coal is a bulky material, which loses weight on use as it is reduced to ash. Hence, heavy industries and thermal power station are located on or near the coalfields.

Coal has not lost its importance in the energy production sector. Coal is used as primary raw material in chemical industry. Coal is also used as raw materials in the production of chemicals, colour, fertilizer, synthetics, and explosives. Sulphur, benzene, ammonia gas etc. are obtained from coal as a bi-product. Therefore coal is termed as "Black Diamond". Almost 2/3rd of coal is extracted from Jhadakhand, Chatisgarh, Odisha and Madhyapradesh. And almost 1/3rd of coal is extracted from Andhra pradesh, Maharastra, West Bengal and Utarpradesh. The major coal mines are found Jaria, Bokaro, Giridiha (Jharkhand), Raniganj(Westbengal), Korba(Chattisgarh), Talcher, Ram pur and Iib (Odisha), Singrauli(Madhyapradesh). Two third of coal produced is used in thermal power plant in Odisha and rest of coal is used in thermal power plant, cement, fertilizer industry etc.

Petroleum

Petroleum or mineral oil is the next major energy source in India after coal. It provides fuel for heat and lighting, lubricants for machinery and raw materials for a number of manufacturing industries. Petroleum refineries act as a "nodal industry" for synthetic textile, fertiliser and numerous chemical industries. Most of the petroleum occurrences in India are associated with anticlines and fault traps in the rock formations of the tertiary age. In regions of folding, anticlines or domes, it occurs where oil is trapped in the crest of the upfold. The oil bearing layer is a porous limestone or sandstone through which oil may flow. The oil is prevented from rising or sinking by intervening non-porous layers. Petroleum is also found in fault traps between porous and non-porous rocks. Gas, being lighter usually occurs above the oil.

About 63 per cent of India's petroleum production is from Mumbai High, 18 per cent from Gujarat and 16 per cent from Assam. Basein and Aliabet are two offshore oil field. Ankeleshwar is the most important field of Gujarat. Koyeli is the second oil field of Gujurat. Assam is the oldest oil producing state of India. Digboi, Naharkatiya and Moran-Hugrijan are the important oil fields in the Assam state. The crude oil extracted from Gujarat is sent to Trambe and Koyeli

refinaries for refinement. The crude oil transported to the refinaries after

extraction from the oil fields through pipe lines. Visakhapatnam of Andhra Pradesh, Kochin of Kerala, Mathura of Uttar Pradesh, Haladia of West Bengal , Chennai of Tamil Nadu, Paradeep of Odisha and Barauni of Bihar are some of the important refineries in India.

Natural Gas

Natural gas is an important clean energy resource found in association with or without petroleum. It is used as a source of energy as well as an industrial raw material in the petrochemical industry. Natural gas is considered an environment friendly fuel because of low carbon dioxide emissions and is, therefore, the fuel for the present century. Large reserves of natural gas have been discovered in the Krishna- Godavari basin.

Along the West coast the reserves of the Mumbai High and allied fields are supplemented by finds in the Gulf of Cambay. Andaman and Nicobar islands are also important areas having large reserves of natural gas. The 1700 km long Hazira-Bijaipur-Jagdishpur cross country gas pipeline links Mumbai High and Bassien with the fertilizer, power and industrial complexes in western and northern India. This artery has provided an impetus to India's gas production. The power and fertilizer industries are the key users of natural gas. Use of Compressed Natural Gas (CNG) for vehicles to replace liquid fuels is gaining wide popularity in the country.

Electricity

Electricity has such a wide range of applications in today's world that, its percapita consumption is considered as an index of development. Elecctricity is generated mainly in two ways: by running water which drives hydro turbines to generate *hydro electricity;* and by burning other fuels such as coal, petroleum and natural gas to drive turbines to produce *thermal power.* Once generated the electricity is exactly the same.

WORK FOR YOU - Name some river valley projects and write the names of the dams built on these rivers.

Hydro electricity is generated by fast flowing water, which is a renewable resource. India has a number of multi-purpose projects like the Bhakra Nangal, Damodar Valley corporation, the Kopili Hydel Project etc. producing hydroelectric power. *Thermal electricity* is generated by using coal, petroleum and natural gas. The thermal power stations use non-renewable fossil fuels for generating electricity. There are over 310 thermal power plants in India.

WORK FOR YOU – Name the *thermal power stations present in your state and also name the fuel that is used there.*

Nuclear or Atomic Energy is obtained by altering the structure of atoms. When such an alteration is made, much energy is released in the form of heat and

this is used to generate electric power. Uranium and thorium, which are available in Jharkhand and the Aravalli ranges of Rajasthan are used for generating atomic or nuclear power. The Monazite sands of Kerala is also rich in thorium.

There are six Atomic power plants established in our country. Those are Trombay (Maharastra), Kalpakam near Chennai of Tamil Nadu, Raotvata near Kota(Rajasthan), Narora (Uttar Pradesh), Kakrapara in Gujurat, Naiga in Karnataka.

WORK FOR YOU - Locate the 6 nuclear power stations and find out the state in which they are located.

Non-Conventional Sources of Energy

The growing consumption of energy has resulted in the country becoming increasingly dependent on fossil fuels such as coal, oil and gas. Rising prices of oil and gas and their potential shortages have raised uncertainties about the security of energy supply in future, which in turn has serious repercussions on the growth of the national economy. Moreover, increasing use of fossil fuels also causes serious environmental problems. Hence, there is a pressing need to use renewable energy sources like solar energy, wind, tide, biomass and energy from waste material. These are called nonconventional energy sources. India is blessed with an abundance of sunlight, water, wind and biomass. It has the largest programmes for the development of these renewable energy resources.

Solar Energy

India is a tropical country. It has enormous possibilities of tapping solar energy. Photovoltaic technology converts sunlight directly into electricity. Solar energy is fast becoming popular in rural and remote areas. Cooking food, heating water, Solar cells, for running refrigerators and lighting the Street lamps are can be done by using Solar Energy. This Solar Energy helps in heating the houses during winter in the day time. The desert region of our country plays an important role in conserving solar energy.

The largest solar plant of India is located at Madhapur, near Bhuj, where solar energy is used to sterlise milk cans. It is expected that use of solar energy will be able to minimise the dependence of rural households on firewood and dung cakes, which in turn will contribute to environmental conservation and adequate supply of manure in agriculture.

Wind power

India now ranks as a “wind super power” in the world. The largest wind farm cluster is located in Tamil Nadu from Nagarcoili to Madurai. Apart from these, Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep

have important wind farms. Nagarcoil and Jaisalmer are well known for effective use of wind energy in the country.

Biogas

Shrubs, farm waste, animal and human waste are used to produce biogas for domestic consumption in rural areas. Decomposition of organic matter yields gas, which has higher thermal efficiency in comparison to kerosene, dung cake and charcoal. Biogas plants are set up at municipal, cooperative and individual levels. The plants using cattle dung are know as *'Gobar gas plants'* in rural India. These provide twin benefits to the farmer in the form of energy and improved quality of manure. Biogas is by far the most efficient use of cattle dung. It improves the quality of manure and also prevents the loss of trees and manure due to burning of fuel wood and cow dung cakes.

Tidal Energy

Oceanic tides can be used to generate electricity. Floodgate dams are built across inlets. During high tide water flows into the inlet and gets trapped when the gate is closed. After the tide falls outside the flood gate, the water retained by the floodgate flows back to the sea via a pipe that carries it through a power-generating turbine.

In India, the Gulf of Kuchchh, provides ideal conditions for utilising tidal energy. A 900 Mega Watt tidal energy power plant is set up here by the National Hydropower Corporation (NHC).

Geo Thermal Energy

Geothermal energy refers to the heat and electricity produced by using the heat from the interior of the Earth. Geothermal energy exists because, the Earth grows progressively hotter with increasing depth. Where the geothermal gradient is high, high temperatures are found at shallow depths. Groundwater in such areas absorbs heat from the rocks and becomes hot. It is so hot that when it rises to the earth's surface, it turns into steam. This steam is used to drive turbines and generate electricity. There are several hundred hot springs in India, which could be used to generate electricity.

Two experimental projects have been set up in India to harness geothermal energy. One is located in the Parvati valley near Manikarn in Himachal Pradesh and the other is located in the Puga Valley, Ladakh.

Conservation of Energy Resources

Energy is a basic requirement for economic development. Every sector of the national economy – agriculture, industry, transport, commercial and domestic – needs inputs of energy. The economic development plans implemented since Independence necessarily required increasing amounts of energy to remain operational. As a result, consumption of energy in all forms has been steadily

rising all over the country. In this background, there is an urgent need to develop a sustainable path of energy development.

Promotion of energy conservation and increased use of renewable energy sources are the twin planks of sustainable energy. India is presently one of the least energy efficient countries in the world. We have to adopt a cautious approach for the judicious use of our limited energy resources.

For example,

1. as concerned citizens we can do our bit by using public transport systems instead of individual vehicles;
2. switching off electricity when not in use,
3. using power-saving devices and using non-conventional sources of energy.
4. After all, “energy saved is energy produced”.

Exercise

1-Choose the right answer.

(a) Which one is the example of conventional energy?
(i) Wind (ii) coal (iii) solar energy (iv) tide

(b) Which state is the oldest state in producing petroleum?
(i) Maharastra (ii) Gujurat (iii) Assam (iv) Andhra Pradesh

(c) Which minerals from following can be get from the Monzanite sand?
(i) Coal (ii) Uranium (iii) mineral oil (iv) thorium

(d) Which coal is famous for the industrial requirement?
(i) Peat (ii) bituminous (iii)Lignite (iv) anthrasite

2- Answer the following question in 30 words.

(a)write down the differences

(i) conventional energy and non conventional energy

(ii) Hydroelectricity and Thermal electricity

(b) what is the requirement o f energy conservation?

(c)Why people are motivated not to use woods and cow dung ?

(d) Give an insight about the distribution of natural gas.

3-Answer the following question in 120 words.

(a) Give an account about the tidal and thermal energy in India.
(b) Why do you think that use of solar energy will be more in the future?

UNIT 7

Manufacturing Industry

Production of goods in large quantities after processing from raw materials to more valuable products is called manufacturing.

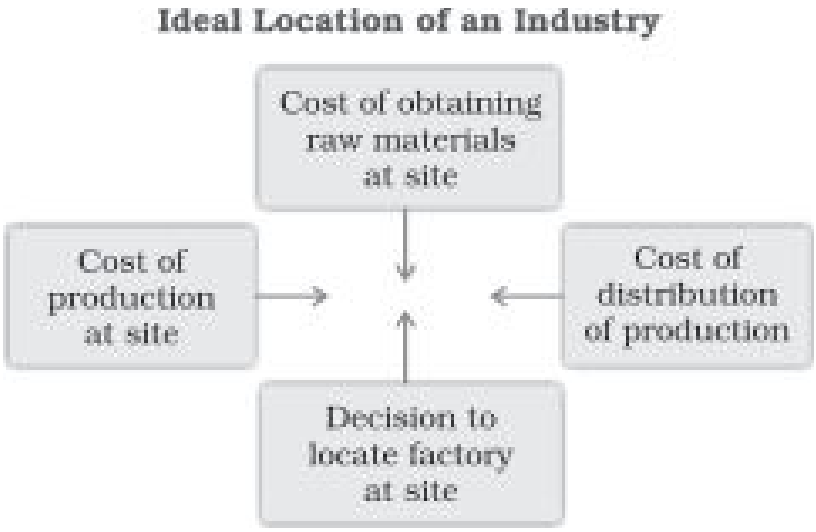
We collect lots of materials from nature directly. We get fruits, crops, flowers from soil, wood, medicinal plants etc. from forests. We get some of our useful minerals from the beneath the earth. They are termed as minerals. The materials which we get directly from nature are called as primary resource. Human being does not use all the primary resource directly. Like cotton, iron ore, bauxite are not used directly. These resources are converted in to usable product by processing. So we prepare sugar from sugarcane, aluminum from bauxite, petrochemical products from petroleum. These products are called as secondary product. We require handmade tools and machines for processing

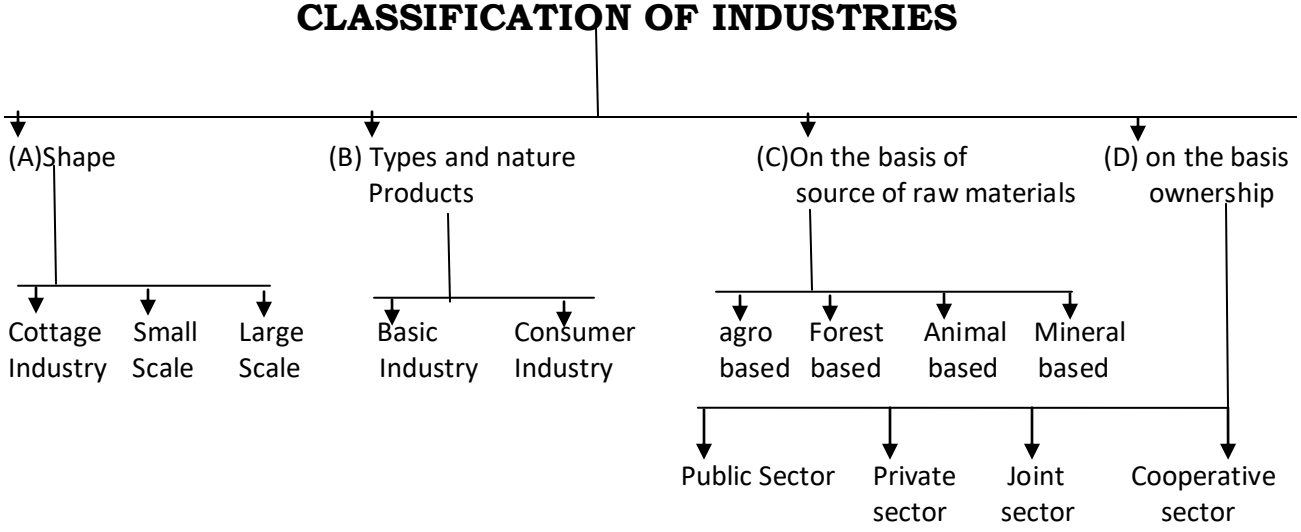
So now we clear that the process of preparing various kinds of products by using tools and machines from raw materials which is termed as manufacturing. Generally it is possible from industrialization. Here, we cannot include fisheries and tourism industries in manufacturing industry.

The industrial revolution occurred in Europe in 19^{th} century has encouraged the setting up of industries in various countries. But many years before of it, Indians had the knowledge and technologies for it. The iron made pillar in the front of Qutub Minar in Delhi is the proof for it. Before independence an iron based industry had set up in Porta Nova of Tamil Nadu in 1830. A cotton industry had set up in Mumbai in 1854 and a jute industry has set up at Risro, Kolkata in 1855. After the independence the development of manufacturing industries is being done by various 5 year plans started from the year 1951.

Industrial Location

Industrial locations are complex in nature. These are influenced by natural factors like availability of raw materials, land, energy, water, climate and Cultural factors like labour, market, transport, capital, banking, Govt. Policy and market etc. It is rarely possible to find all these factors available at one place. Consequently, manufacturing activity tends to locate at the most appropriate place where all the factors of industrial location are either available or can be arranged at lower cost. After an industrial activity starts, urbanization follows. Sometimes, industries are located in or near the cities. Thus, industrialization and urbanization go hand in hand. Cities provide markets and also provide services such as banking, insurance, transport, labour, consultants and financial advice etc. to the industry. Many industries tend to come together to make use of the advantages offered to make use of the advantages offered by the urban centres known as agglomeration economies. Gradually, a large industrial agglomeration takes place.





CLASSIFICATION OF INDUSTRIES –

1)According to Shape (investment)

The size of industry depends upon the investment, number of laborer associated, and the price of the products. The types of industries are (a) Large scale industries (b) small scale industries (c) Cottage industries.

(a)Cottage industries

It the smallest industry among the manufacturing industries. Here an artisan produce the finished goods by using the locally available raw material, simple tools and by traditional methods. He works from his home and his family member help him fully or partially in this work. Khadi Gramudyog, handicrafts, gold and silver filigree, brass and bronze utensils are the examples of the cottage industries. No wages are given as there are laborers used in this type of industry, only owners are the workers.

WORK FOR YOU – List the cottage industries other than mentioned above.

(b) Small scale industries

In this type of industries both laborer and machines are together associated with the production process. The investment is low and the waged laborers are less. If the raw materials are not available locally then he brings it from outside. He sells his products in open market through businessmen. Paper made articles, toys, furniture articles, edible oil, leather goods, radio, television and electrical goods etc are the examples of small scale industries. Now the limitation of investment in setting up of this type of industries is one Crore.

***India:** Distribution of cotton, woollen and silk industries*

(c)Large scale industries

In this type of industries the production process takes place with the help of huge machines run by energy. Large quantity of Raw materials and labors are required for this type industry. The production of these industries is large in size and heavy in weight. Iron and Steel industries, textile

industries, petrochemical industries, ship manufacturing industries, large machines manufacturing Industries etc are the examples of large scale industries.

2.Type and nature of products

By the type and nature of the product it can be classified in to 2 types

a.Basic industry:

The end product of one industry become the raw material to the other manufacturing industry is known as Basic Industry or Key industry. Example – iron and steel produced from the Iron and steel Plant is used as raw materials for manufacturing of various machineries and tools. Hence iron and steel plant is a Basic Industry. If the end product of any industry is heavy and large in size then it is known as **Heavy Industry**.

b. Consumer industry

If the end product of any industry is directly used by consumers it is known as consumer industry. Tea, soap, bread, biscuit, radio, TV are called as consumer industry. The raw materials used in this type of industry is less in weight hence the end products are also not heavy. Hence this type of industry is termed as Light Industry.

3.On the basis of source of raw material

The industries can be classified in to 4 kinds according to the availability of sources of raw materials.

a.Agro based Industry

The raw material obtained from agriculture therefore it is called as agro based industry. Tea, sugar, cotton, vanaspati oil, rubber, jute industries are come under the Agro based industries.

b.Forest based industry

The industries are established using the raw materials collected from the forests are called as forest based industries. Paper industries, furniture, packing materials are come under these industries.

c.Animal based industry

The industries which use raw material obtained from the animals are called as animal industry. Fisheries, leather industries, milk based industries are come under this kind of industries.

d.Mineral based industry

This kind of industry uses the minerals as raw material. Iron and steel industries, Cement industries, aluminum industries, petro chemical industries are come under the mineral based industry.

4.On the basis of Ownership

The manufacturing industries are classified in to 4 parts on the basis of ownership.

a.Public Sector industry

When the industries are owned and managed/operated by the Government or Government agencies, are called as Public Sector Companies. Rourkela steel plant owned and managed by SAIL, Steel Authority of India, BHEL, Bharat Heavy Electrical Limited are come under it.

b.Private Sector Industries

This kind of industries owned and managed/operated by an individual, family or by corporate group. Reliance, TATA, Bajaj Auto are included in this kind of industries.

c.Joint sector

The industries which are set up and governed/run jointly by both private (individual) and Central and State Government are called as joint sector industries. Maruti udyog and OIL India are included in it.

d.Cooperative industries

Cooperative sector industries are owned and operated by the producers or suppliers of raw materials, workers or both. They pool in the resources and share the profits or losses proportionately. The Amul milk product industry of Gujarat, sugar industries of Maharashtra, Coir industry and Lijjat Papad of Kerala etc are come under this.

Mineral based industries

a.Iron and steel industries

Iron and steel industries are mineral based industries. This is like backbone of modern India. It is known as Basic industry as other industries like heavy and small industries depend on it. The first iron and steel industry which had set at in 1830 Potonova, Tamilnadu later closed. After that a modern iron and steel industry was set up at Kulti of west Bengal. In 1907, the TATA Iron and steel company (TISCO) was established in Jamshedpur by TATA group laid the foundation stone of the modern iron and steel industrialization in India. Later Indian iron and steel company was set up at Barnapur, West Bengal and Vishveshrayya Iron and Steel Company in Bhadravati, Karnataka is established in the name of famous engineer Vishveshrayya. After independence, by using technological help of various foreign countries, India has established number of iron and steel industries. E.g.: Rourkela, Odisha (German collaboration), Bhillai of Chatisgarh (Soviet Russia collaboration), Durgapur of West Bengal (Britain), Bokaro of Jharkhanda (Russia), Salem of Tamil Nadu, Vishakhapatnam of Andhra Pradesh, Karnataka and Vijaynagar integrated steel plant in Karnataka. Besides these, around 200 mini iron and steel industries are set up in our country.

India is at 9^{th} place in the world by producing 32.8million tons iron and steel. But, as per the reliable sources, per capita consumption of iron and steel in our country is around 32 Kgs. Iron and steel is a heavy industry because all the raw materials as well as finished goods are heavy and bulky entailing heavy transportation cost. Iron ore, coking coal and calcium carbonates (lime stone) are required in a ratio 4:2:1. Manganese and Chromite is used to make steel and iron

strong. Both raw materials and finished goods require efficient transport network for their distribution to the markets and consumers.

To minimize the expenditure the industries are set up nearer to the iron ore mines. Except, port base industry like Vishakhapatnam all the major steel and iron industries has set up near the mineral rich south plateau. All the public sector iron and steel industries market their steel through Steel Authority of India Ltd (SAIL).

Work for you : collect the information about steel plants located in the map given below.

India: Iron and Steel Plants

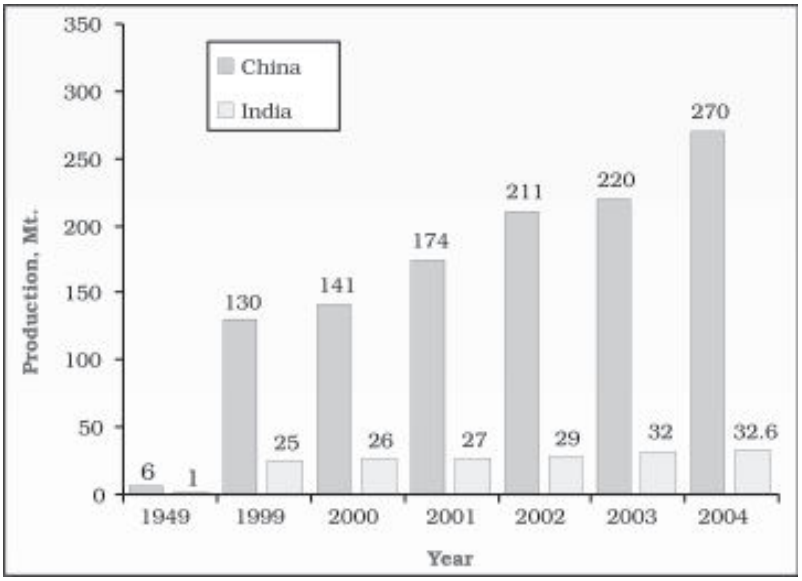
In the 1950s China and India produced almost the same quantity of steel. Today China is the largest producer of steel. China is also the world's largest consumer of steel. In 2004, India was the largest exporter of steel which accounted for 2.25 per cent of the global steel trade. Chotanagpur Plateau region has the maximum concentration of iron and steel industries. It is largely, because of the relative advantages this region has for the development of this industry.

These include, low cost of iron ore, high grade raw materials in proximity, cheap labour and vast growth potential in the home market. Though, India is an important iron and steel producing country in the world yet, we are not able to perform to our full potential largely due to (a) high costs and limited availability of coking coal (b) lower productivity of labour (c) irregular supply of energy and (d) Poor infrastructure.

We also import good quality steel from other countries. However, the overall production of steel is sufficient to meet our domestic demand.

Liberalization and Foreign Direct Investment have given a boost to the industry with the efforts of private entrepreneurs. Example – Bhusan Steel, Jindal Steel, Posco India – Company in collaboration with South Korea, Arcelor Mittal Etc.

Steel production in India and China between 1999 to 2004



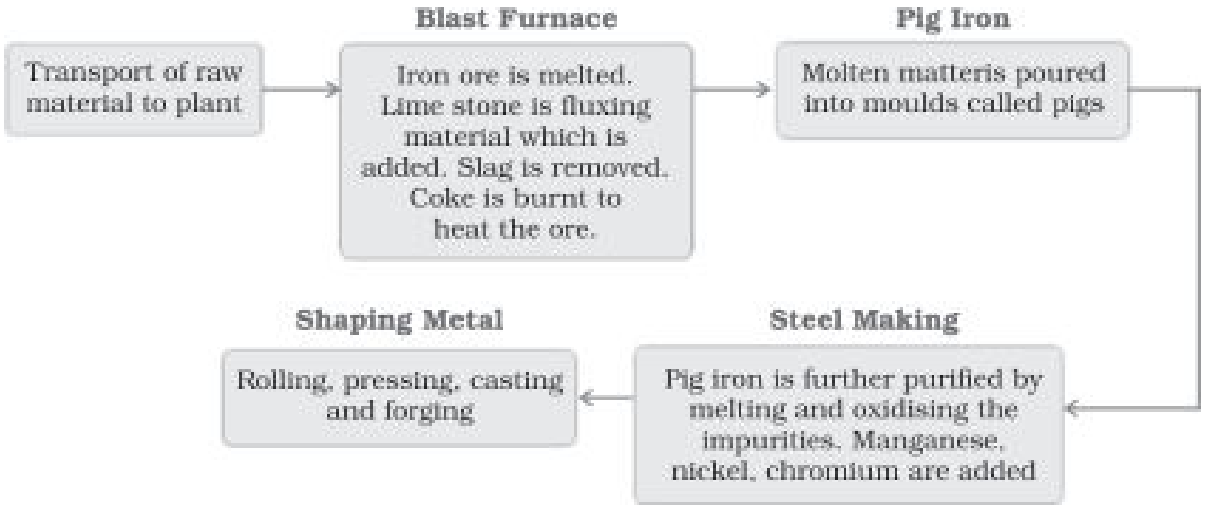
Aluminum Industry

Aluminum industry is the second most important metallurgical industry in India after the steel and iron industry. Aluminum metal is light resistant too corrosion, a good conductor of heat, malleable and becomes strong when it mixed with other metals, therefore it is used in various kinds of industries. It is used as substitute element of iron, copper, lead and the demand of this metal is increasing day by day.

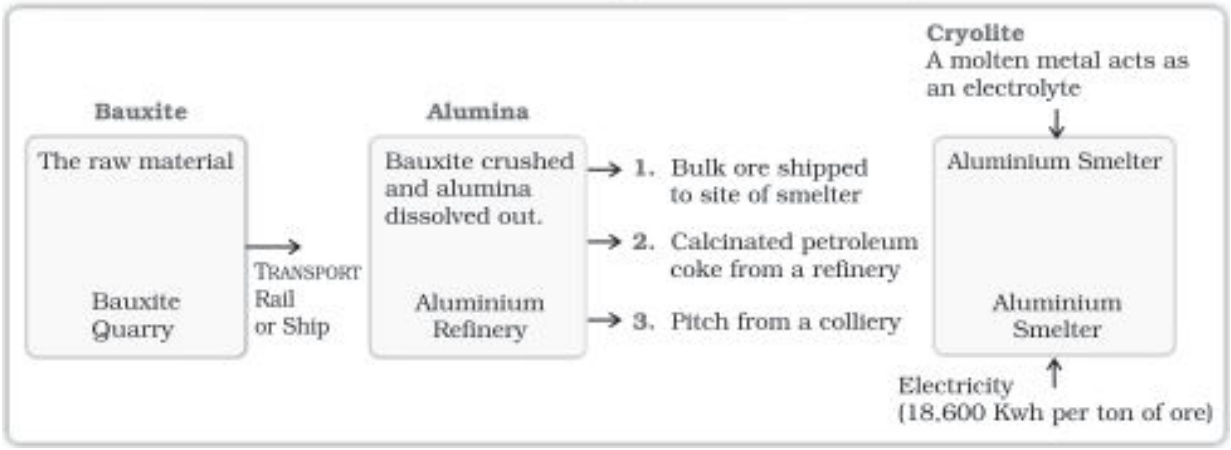
To extract 1 ton of aluminum, we need 6 tons of Bauxite. Alumina is extracted from the Bauxite then it is converted in to aluminum. A large quantity of electricity is used in extraction of aluminum. 30 -40% of total expenditure of the aluminum extraction is spent on electricity. Now there are 5 Aluminum industries in India.

NALCO, BALCO are most important industries located in Odisha. Besides these two other Aluminum smelting plants are located West Bengal, Kerala, Uttar Pradesh, Chhattisgarh, Maharashtra and Tamil Nadu. Around 600 ton aluminum extracted in India in a year.

Processes of Manufacture of Steel



Process of Manufacturing in Aluminium Industry



Paper Industry

Paper industry is a forest base industry. Paper is one of the most useful products of daily life. Paper is used books, note books and newspaper. Now a days, paper is used for packing different items. Paper can be produced by hand but it is very costly. In 1860 the paper has prepared for first time in India. Before independence there were 15 paper mills and one lakh ton papers were produced. And during 1971-72 the number increased to 60 and production increased to 7 lakh ton.

Soft wood, grass, wood pulp, sugar cane waste, waste from cotton, other waste papers are the raw materials for the paper industry. Apart from the above materials, various chemicals (Caustic Soda, alkaline soda, bleaching power), sufficient sweet water, and energy are required for it. Generally paper industry depends on the raw materials, and nearest market place. Many big paper mills are located in the suburbs of Kolkata which fulfill around one fourth requirement of paper of our country.

These mills are depend on the bamboo plants grown in Sunderbans of Kolkata, Odisha, Jharkhand, Bihar and Assam and Sawai grass of Madhya Pradesh and Chhatisgarh. Maharashtra is regarded as second important place for paper industries. Rags, used papers, news paper and wood pulps are used as raw materials. Paper mills are also found in Gujarat. Titagarh in west Bengal, Brajrajnagar in Odisha, Dalmiyanagar in Bihar, Lukhnow in Uttar Pradesh, Faridabad in Hariyana, Mumbai in Maharashtra, Bhadrabati in Karnataka has major paper mills of India. The papers produced from bamboo are of high quality and papers produced from grass are of low quality. The south east part of India has sufficient amount of raw materials for paper industries, but paper mill was established for the first time in these area in the year 1960. The paper required for news print is produced at Nepa Nagar at Madhya Pradesh, like wise paper required for currency is produced at Hosangabad, Madhya Pradesh. Even though India has sufficient soft wood pulp in Alpine forest area which gives good quality pulp, but it cannot be used due to transportation charges and various other miscellaneous expenditures.

Do you know: The Orient Paper mill of Brajarajanagar has closed now as there is no production.

Engineering Industries

Before independence India was importing various machines from England and German. We had to depend on the foreign countries for the machines required for sugar industries, paper mill, tea industries etc. But the situation is changed now. India has significantly developed in the field of manufacturing of machines. Heavy machines, turbines used in energy generators, machines used in fertilizer industries, iron and steel industries, various tools and machines used Petro chemical industries are now manufactured in India.

Heavy Engineering Corporation of Ranchi, Jharkhand makes machines for heavy industries. The cranes are used in mining industries are made at Durgapur. Bharat Heavy Electrical Limited located in Bhopal and Haridwar manufactures large turbines for electricity generation. Surgical equipment and telephones are manufactured by the Indian manufactures in various places. India became independent in this field.

India has also made sufficient developments in the field of transportation. Indian Railways has attained lots of success in the field of technology. Indian railway now manufacture train engines,

train coaches, wagons etc. Steam engine, Diesel engine and Electric engines are manufactured in India. As the potential of steam engine is less and pollutes the environment, manufacturing of steam engines are stopped. Diesel engines are manufacturing factory is located at Varanashi and Jamshedpur. All kinds of engines are manufactured at Chitaranjan Nagar of West Bengal. Coaches are manufactured at Perambur, Tamilnadu. Non Government workshops are also established in India to repair the coached of Goods as well as travellers' coaches. There is a coach repairing industry situated at Mancheswar, Odisha. Various kind of vehicles and it's parts are manufactured in our country. Vehicles like bus, truck, car, tempo, bicycle, scooters, tractor and other business oriented vehicles are manufactured in India. India is at 2nd position in the world in manufacturing of 3 wheelers.

There are 15 millions of cycles, 4 millions f scooters and motor cycles are manufactured in India. These kinds of manufacturing industries are situated in big cities like Delhi, Gudgaon, Mumbai, Chennai, Pune, Kolkata, Lukhnow, Indore, Hyderabad, and Jamshedpur etc. Skilled workers and technological facilities are sufficiently available in these place. Maruti Udyug (gudgeon), Hindustan Motor (Kolkatta), have set up their own motor vehicle manufacturing industries. TATA motors in Jamshedpur and Ashok Leyland in Chennai manufacture thousands of numbers of trucks and distributed in market. Mahindra and Mahindra is manufacturing various type of four wheelers and distributing in market. Nissan and Jongazip is manufacturing Shaktiman truck for Indian army. After Liberalization of Market, many foreign companies like Honda (Japan), Suzuki, Ford (U.S.A) has started doing business by setting up their industries in India.

Ship Manufacturing Industries

Ship manufacturing industry is a very big industry in India. A huge amount as a capital is required in this industry. Now India has 5 ship manufacturing industries namely Vishakhapatnam, Kochi, Mumbai, Marmagoa and Kolkata. These are public enterprises. Both war ships and transportation ships are manufactured here. Steamers, Barze, Drazer, and coastliners are also manufactured. Ship manufacturing company in collaboration with Japan is located at Koti which manufactures ship worth one lakh DWT (Dead Weight Tonnage) and 50000 (DWT) worth ship manufacturing company is located at Vishakhapatnam. There are about 16 Dry docks present in India which manufacture and repair the ships.

Aeroplane manufacturing Industry

India has not entered in to manufacturing of civil airplane.There are industries for manufacturing defence airplanes at Bengaluru, Sunabeda (Koraput), Nasik, Hyderabad, Kanpur, Lukhnow. Two helicopter namely "Krusak" and "Puspak" are manufactured at Bangalore, suitable for agricultural propose. Fighter Planes like Kiran (for training), Marut supersonic jet fighter plane (MIG21), Light weight fighter plane, Gnat are manufactured in India.

Electronics Industry

Electronic industry includes manufacturing of transistor to T.V, Telephone exchange, Fax, computers, Mobile set and various machines use by the postal department, electronic industry etc. This Department supply instrument required by defense, railway, aviation and space fields. The use of these electronics leads affect the life of common man in positive way and move our economy in to developmental direction. Now India has a special status in the field of computer

software and hardware making. Bangalore is known as the Electronic Capital of India. There are 18 software parks across our country. This has created so many employments. It employed around one million people by 31st March 2005. 30% of the total employment was women. This is very much encouraging. India got the benefit of 2.4% of total export from electronic industries.

Do you know : Infocity is set up at Bhubaneswar, Odisha which brought a significant Development in the field of computer industry of our State.

India: Software Technology Parks

Contribution of Industry to Indian Economy :

Contribution of Industries to the Indian economic development is very significant. The industrial infrastructure of India was weak at the time of independence but just after the independence India started developing since 1951. Before independence India had to depend on other country for consumer goods but now India is not only independent but also able to exporting it. India has developed a lot in the field of iron and steel industry. Our country had strengthened its economy by using the raw material produced within the country. It also strengthened our foreign exchange. Significant changes taken place in the field of energy, transportation and communication. Surplus staff employed in the industrial and agricultural fields increased the growth of the nation and per capita growth. It also help in increase in the development of Indian Economy. The developmental index was 7% in last decade now it is increased to 9-10% since the year 2003. It is expected that the growth will increase to 12% in the next decade. National Manufacturing Competitiveness Council (NMMC) is formed to detect the growth percentage.

Environmental pollution and Environmental Degradation.

Although industries contribute significantly to India's economic growth and development. The increase in pollution of land, water, air, noise and resulting degradation of environment that they have caused, cannot be overlooked. Industries are responsible for four type of pollution – (a) air (b) water (c) land (d) noise. The polluting industries also include thermal power plants.

Air pollution is caused by the presence of high production of undesirable gases, such as sulphur dioxide and carbon monoxide. Air borne particulate materials contain both solid and liquid particles like dust, sprays mist and smoke. Smoke is emitted by chemical and paper factories, brick kilns, refineries and smelting plants, and burning of fossil fuels in big and small factories that ignore pollution norms. Toxic gas leaks can be very hazardous with long-term effects. This is seen in Bhopal Gas tragedy which occurred in the year 1984 where the Methyle isocyanide gas is released from the Union Carbide Corporation of Bhopal. Thousands of people affected till date and few thousands were died. Air pollution adversely affects human health, animals, plants, buildings and the atmosphere as a whole.

Water pollution is caused by organic and inorganic industrial wastes and affluents discharged into rivers. The main culprits in this regard are paper, pulp, chemical, textile and dyeing, petroleum refineries, tanneries and electroplating industries that let out dyes, detergents, acids, salts and heavy metals like lead and mercury pesticides, fertilizers, synthetic chemicals with carbon, plastics and rubber etc. into the water bodies. Fly ash, phosphor-gypsm and iron and steel slags are the major solid wastes in India.

Thermal pollution of water occurs when hot water from factories and thermal plants is drained into rivers and ponds before cooling. What would be the effect on aquatic life?

Wastes from nuclear power plants, nuclear and weapon production facilities cause cancers, birth defects and miscarriages. Soil and water pollution are closely related. Dumping of wastes specially glass, harmful chemicals, industrial effluents, packaging, salts and garbage renders the soil useless. Rain water percolates to the soil carrying the pollutants to the ground and the ground water also gets contaminated.

Noise pollution not only results in irritation and anger, it can also cause hearing impairment, increased heart rate and blood pressure among other physiological effects. Unwanted sound is an irritant a source of stress. Industrial and construction activities, machinery, factory equipment, generators, saws and pneumatic and electric drills also make a lot of noise.

CONTROL OF ENVIRONMENTAL DEGRADATION

Everyday litre of waste water discharged by our industry pollutes eight times the quantity of freshwater. How can the industrial pollution fresh water be reduced? Some suggestions are –

i. Minimizing use of water for processing by reusing and recycling it in two or more successive stages.
ii. Harvesting of rainwater to meet water requirements
iii. Treating hot water and effluents before releasing them in rivers and ponds. Treatment of industrial effluents can be done in three phases
    a. Primary treatment by mechanical means. This involves screening, grinding, flocculation and sedimentation.
    b. Secondary treatment by biological process
    c. Tertiary treatment by biological, chemical and physical processes, this involves recycling of wastewater.

Overdrawing of ground water reserves by industry where there is a threat to ground water resources also needs to be regulated legally. Particulate matter in the air can be reduced by fitting smoke stacks to factories with electroplatic precipitators, fabric filters, scrubbers and inertial separators, smoke can be reduced by using oil oor gas instead of coal in factories. Machinery and equipment can be used and generators should be fitted with silencers. Almost all machinery can be redesigned to increase energy efficiency and reduce noise. Noise absorbing material may be used apart from personal use of earplugs and earphones.

The challenge of sustainable development requires integration of economic development with environmental concerns.

NTPC shows the way

NTPC is a major power providing corporation in India. it has ISO certification for EMS (Environmental Management System) 14001. The corporation has a pro-active approach for preserving the natural environment and resources like water, oil and gas and fuels in places where it is setting up power plants. This has been possible through :

a) Optimum utilization of equivalent adopting latest techniques and upgrading existing equipment.
b) Minimizing waste generation by maximizing as utilization.
c) Providing belts for nurturing ecological balance and addressing the question of special purpose vehicles for afforestion.
d) Reducing environmental pollution through ash pond management, ash water recycling system and liquid waste management.
e) Ecological monitoring, reviews and online database management for all its power stations.

WORK FOR YOU

1.Make a list of various things produced by the manufacturing industry using agricultural products.

2.Conduct a quiz competition about the industries between two teams

3.Make a list of manufacturing industries located in your region.

4.Make a list of raw materials available in your region supplied to the manufacturing industries.

5.Many manufacturing industries are established in Western Odisha. Write a short note about the reason for establishing these industries.

6.Make a list of National Industrial Organisations present in your region.

7.Collect the detailed information and photograph of the Manufacturing industry found nearby your region and hand it in your class.

8.Inspect and collect the information about what type pollution is caused by the Industry and whether the pollution can be controlled or not.

9.Make a list of companies established by the foreign collaboration and discuss with your friends about it.

10. If your school is functioning near any industry then find out what type pollution is caused by the industry and whether it is hazardous or not.

EXERCISE

A.MULTIPLE CHOICE QUESTIONS

1. Which industry use bauxite ore?
   a. Iron b. Copper c. Aluminum d. Cement

2. Which institution is related to Iron and Steel industry?
   a. SAIL b. NALCO c. OIL d. BALCO

3. Which among these is not a National organization?
   a. SAIL b. TISCO c. NALCO d. IDCO

4. In which place of India Railway coaches are manufactured?
   a. Kapurthala b. Varanasi c. Perambur d. Kolkata

B.Mark the following in India outline map.

(a)Ship manufacturing company

(b)Iron and steel industry

(c)Electronics industry

(d)Aeroplane industry

C-Write down the full form of followings

(i)IISCO (ii) SAIL (iii) TISCO (iv) NALCO (v) MNC

D-Answer the following

1. What do mean by manufacturing industry?
2. What are primary products? Give examples.
3. What are basic industries? Make a list of it.
4. What are all the natural factor required for establishing an industry?
5. What do mean by joint sector industry?
6. What do mean by Multinational Industries?

5-Answer the following

1. What is the contribution of Industry to Indian Economy?
2. Mention the classification of manufacturing industry on the basis of ownership and give example.
3. What is industrial pollution? What are measure are taken to control industrial pollution?
4. How NTPC is controlling pollution?
5. What are the facilities available in India for ship manufacture?
6. Give a brief account of Iron and Steel industry in India?

6-Differenciate between

a- Cottage industry and small industry
b- Basic industry and Consumer industry
c- Joint industry and cooperative industry
d- Heavy industry and Light industry
e- Public sector industry and private sector industry

7-Give reasons.

a- Iron and steel industries are set up at places where raw materials are easily available.
b- Vehicle manufacturing industries are set up near the big cities.
c- Iron and steel industry is considered as primary industry.
d- Bangalore is called as the electronics capital of India.
e- Chemical industry creates problem to populous place.

8-Give your opinion on a topic called "Environmental Pollution is a National problem."

LESSON EIGHT TRANSPORTATION, COMMUNICATION AND TRADE

All resources which help to strengthen the country's financial situation, are called basic infrastructure. Good infrastructure includes transportation, railways, roads, ports, and aviation. Communications (telephones, mobile phones, internet mails, etc.) and electricity transportation and distribution plays crucial role in the economic development of the country.

Transportation: India is a huge country. Transport, communication, and trade are all that is needed to increase social resources, accelerate economic development, strengthen the country's strong defense system, and maintain regional unity. The process of transporting passengers or goods from one place to another is called transportation. The transports used to take all these from place are called vehicles. In the past, people carried their belongings on their heads or shoulders with their own weight. Over the time, domestic animals such as donkeys, horses, mules, oxen, and buffaloes were used to carry loads. After the invention of the wheels, he was able to carry goods in bullock carts and tangas driven horses.

In every part of India, men and women are still be seen on streets carrying goods or loads of grains, firewood or other household items on their head or shoulders. Hand driven rickshaws and bullock carts, bicycles, rickshaws, trolleys, etc. are still prevalent.

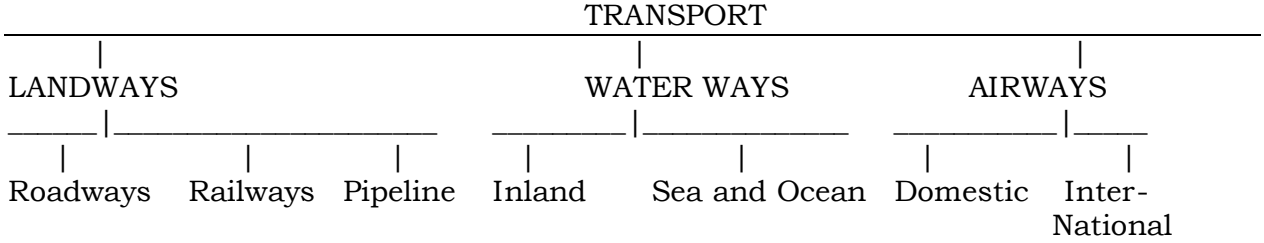
However, now transport is heavily dependent on mechanical power. The transportation system is comparable to the blood circulation of the human body. Like blood circulating system is as important to the well-being of the human similarly transport is to the economic well-being of the country. Transportation connects the product and the consumer. The delivery of goods can be made more convenient by today's fast transportation system. People from different regions are getting closer to each other through the transportation system. This eliminates discrimination through the exchange of ideas and strengthens the sense of unity. As a result of the improvement of roads, natural resources that have been left unused in hills, mountains, forests and mines can be put into production. The transportation system supplies raw materials, fuel and machinery to the industrial sector and the manufactured goods can be delivered to the market. Transportation helps connecting, delivering and distribution of relief goods during war, natural disaster, and other emergencies.

Transportation is carried out in three ways – Land, water and air transportation. There are five types of transport systems in India, including water, land and air. These are - (i) Roadways (ii) Railways (iii) Pipelines (iv) Waterways (v) Airways

ROADWAYS

Roadways are the most important of all transportation systems. Roadways of India is one of the largest transportation systems in the world. Construction of Roadways started way back since ancient period. Evidences of this can be seen in ancient Mahenjadaro and the Harappan civilization. Roads were built in India at the behest of rulers like Ashok and Chandragupta Maurya. Good roads were also built during the Mughal dynasty. Many of roadways of today are built following the Mughal era. During Shershah's period, a road was built from Kolkata in the east through the Ganges Plateau to Peshawar (now Pakistan) in the west. This is called Grand Trunk Road. India's transportation system is unsatisfactory compared to its size and population. It is convenient to transport passengers and goods for short and medium distances by road. The cost of building and maintaining roads is lower than that of railway lines. Roads can also be built in mountainous areas. Door to Door Service can be provided by road transport, which is not possible by railways. Perishable, or more rapidly decomposing products, such as vegetables and fruits, are more convenient to transport throw roadways than other means of transport. But Roadways are less convenient than railways for long-distance transportation of passengers and goods.

From the beginning of the first five-year plan, the emphasis was laid on the development of the transportation system. At present, the total length of all India roads is about 59.32 lakh kilometers. This includes both concrete and mud roads. India ranks second in the world in terms of road transport. In India, roads are divided into different categories. (i) National Highways (ii) State Highways (iii) Major District Roads (iv) Rural Roads (v) Border Roads (vi) Golden Quadrilateral Super Highways (vi) International Highways (viii) Express Highway.



(i) National Highways NH: National highways connect the capitals, major cities, industrial and mining areas and ports of the states. The construction and maintenance of these roads are entrusted to the Central Public Works Depatment – CPWD. There are about 1 lakh 42 thousand km long national highways present in our country. About 40 percent of the country's passengers and goods are transported by this route. National Highway 16 runs from Kolkata to Chennai via Bhubaneswar.

The Grand Trunk Road, which runs from Kolkata to Amritsar via Asansol, Kanpur, Delhi, is the country's oldest national highway. India's longest national highway, NH-44, runs from Srinagar to Kanyakumari. It is 3745 km. Long (See map National Highways)

(ii) State Highways - SH: The State Public Works Department (PWD) conducts the construction and maintenance of state highways. It connects the capital of the state with the headquarters, subdivisions and industrial centers of various districts. There is about 1.7 lakh km long state highways present in the country. Maharashtra has the highest number of state highways. It is about 33,705 km. It is followed by the Karnataka State Highway with a length of about 20,738 km.

(iii) Major District Roads: The major district roads connect the district headquarters with its main city blocks, tehsils and large villages. The responsibility of maintainence of these roads is given to the District Council Boards or Zilla Parishad. There are about 6,03,292 km of district roads in the country.

(iv)Rural Roads: Rural Roads connect nearby towns and markets. At present, these roads received special impetus under the Prime Minister's Rural Road Scheme or Pradhan Mantri Grameen Sadak Yojana. Under the this scheme 5,000 villages have been connected to its main city by concrete roads or all season motorable roads. The length of rural roads in Odisha is about 26 lakh km.

(v) The Golden Quadrilateral Super Highways: It connects the cities of Delhi, Kolkata, Chennai and Mumbai with each other by 4-6 lane super highways. It has a length of about 5,840 km. 4 to 6 lane roads has been built known as North-south and east-west corridor (N – S & E - W Corridor). The North-South corridors linking Srinagar, Jammu and Kashmir of north) to Kanyakumari, Tamil Nadu of south and East-West Corridor connecting Porbandar, Gujarat of West to Silchar, Assam in the East. The length of the two routs is about 7,300 km. The country's 10 major ports are connected with Golden Quadrilateral and the North-South and East-West Corridor. These ports are Kandla, Marmagao, Mangalore, Kochi, Tuticorin, Chennai, Enor, (Tamil Nadu) Vishakhapatnam, Paradweep and Haldia.

The Golden Quadruple Expressway has reduced travel and transportation time and distance of mega cities (Delhi - Kolkata -Chennai – Mumbai) of India. These highway projects are being implemented by Nationa Highway Authority of India (NHAI).

Border Roads : The Border Roads Organization has been established in 1960. Roads have been built in the border areas to strengthen national security. The road from Manali in Himachal Pradesh to Sadar sub-division of Leh, is the world's highest mountain roadways. But in terms of national security, a National highway has been built from Delhi via Chandigarh to north of Shimla through Shipki La, a border of India-China. These border roads have been built by border roads organisation under unbearable adverse conditions in the healthy areas of extremely dangerous mountainous areas, dense forests.

Express Highways
Long distance six-lane routs or highways are called the Expressway or Express Highways. The length of the expressway built in India is about 1583.4 km. . These are the Agra-Lucknow Expressway, the Delhi-Meerut Expressway, the Mumbai-Pune Expressway, Kolkata-Damdam Airport Expressway Chandikhola - Sukinda Expressway, Kolkata urgapur Expressway and Delhi-Agra Expressway. At present appx. 1,400 km express highway is built from Delhi to Mumbai.

The International Highway :
The International Highways are built due to increase the number of fast-moving vehicles in the country and keeping in mind the passengers and goods. It is being built with the help of the World Bank. As a result, India's roads are connected to roads of neighboring countries. These countries are Pakistan, Nepal, Bhutan, Bangladesh and Myanmar.

Railways: - Railways are the principal mode of communication and transportation for freight and passengers in India. Railway service was introduced in our country in 1853. In April 1853, first train steamed off from Bombay to Thane covering a rail path distance of 34 km. In 1854, two other trains ran between Kolkata and Raniganj, and in 1856 between Chennai and Arkonam. Indian Railways has been providing rail services to the country for more than 150 years. The Indian Railways is the second largest in Asia and the third largest in the world. (The United States is the first with 2,24,792 km and China is the second with 98,000 km.) The total length of Indian Railways is about 67,368 km., out of this, about 22,224 km. line is electrified. It is the largest department of India, where the maximum number of employees working. About 1,800 trains carry nearly two crore passengers every day. About 100 per cent of the iron ore, iron and steel, 98 per cent of mineral oil, 98 per cent of manganese, 98 per cent of building stone, 90 per cent of cement, 90 per cent of mineral ore, 65 percent of metals, 50 per cent of fertilizers, 35 percent food grains is transported by rail. In view of the importance of rail transport in the country, special attention is being paid to improving the railway system in a planned manner. Various gauge rail lines are still being implemented in the country. These are the Broad gauge (the distance between the two trains is 1.676 meters.) The meter gauge (the distance between the two trains is 1 meter) Narrow Gauge (the distance between the two rail concepts is 0.762 meters and the lift gauge or light gauge (the distance between the two trains is 0.610 meters). Passenger communication and freight transportation is increasing day by day. It is noticed that the cost of moving goods from one gauge train to another is too high. Besides there is wastage of time in transporting goods to draught hit areas, natural disaster area and shifting army. Hence, first priority is given to change narrow gauge and meter gauge lines into broad gauge. This increased work efficiency and reduced the pollution. Therefore preference is given to electrification of railways. To prevent accidents advanced signal systems are introduced. Air conditioned coaches, Super fast expresses like Rajdhani and Shatabdi Express and Intercity super fast trains are being introduced. Reservation of seats has been computerized. Pantry cars are being

introduced in railways for passengers to provide eateries and drinking water. After independence, the railway department was nationalized and its management was entrusted to the Railway Board. All railways in the country are divided into seventeen zones for operational convenience (Table: 18). 18th Railway board (South Coast Railways) has been announced to be established in Vishakhapatnam of Andhra Pradesh in 2019.

Table - 18
Zones of Indian Railways

Sl. No.	Railway Zone	Headquarters.	Total length (km)
1.	North Railway	New Delhi	6968
2.	South Railway	Chennai.	5098
3.	East	Railway Kolkata (Hada).	2914
4.	Western Railway	Mumbai (Churchgate)	6951
5.	Central Railway	Mumbai (CST)	3905
6.	S-E. Railway	Kolkata.	2631
7.	N-E. Railway	Gorakhpur	3667
8.	N-E. Border Railway	Saligao(Guwahati)	3907
9.	South-Central Railway	Secunderabad	5952
10.	East-Coast Railway	Bhubaneswar	2677
11.	South-West Railway	Hoogli	3177
12.	West-Central Railway	Jabalpur	2965
13.	North - Central Railway	Allahabad	3151
14.	S- E Central Railway	Bilaspur	2447
15.	North-West Railway	Jaipur	5459
16.	East Central Railway	Hajipur	3628
17.	Kankan Railway	Nivmumbai	741
18.	South Coast Railway	Walter (Vishakhapatnam)	(Announced)

There are many high-speed trains running on Indian Railways. Among them are the Hamsafar train, the Rajdhani train, the Shatabdi train, the Antodaya train, the war train, the Bande Bharat train, the Tejas train, the Gatiman train, the Sampark Kranti train, and the Double Decker train. Pilgrim trains are also running.

The longest railway line in India is from Dibrugarh to Kanyakumari with a length of 4286 km. The longest railway station in India is Gorakhpur in Uttar Pradesh, with a length of 1366.33 meters. The longest electric rail line in India runs from Delhi to Kolkata via Patna. Among the trains running in India, 'Bande Bharat - 18' is the fastest train, with a speed of 180-200 km per hour.

Metro train: India is undergoing rapid urbanization. According to the 2011 census, more than 31 percent of the population is settled in cities. It is projected that population in urban areas like cities will be increased by 40 percent in 2031 and 50 percent by 2051. At present, sixty-five percent of the country's gross domestic product (GDP) comes from cities, which will be about 75 percent by 2030. As a result, the number of private cars, buses and government cars in the cities is increasing. Roads are becoming congested due to heavy traffic. In view of this, the Government of India has enacted the National Urban Transport Policy (NUTP) in 2006 in the most populous cities. Currently, metro is available in Kolkata, Delhi, Mumbai, Chennai, Bengaluru, Kochi, Hyderabad, Lucknow, Nagpur, Ahmedabad, Gandhinagar, Jaipur, etc. Plans are underway to provide similar facilities in other cities in the future.

Pipeline: Liquid and steam transport is possible through the pipelines. Water is usually supplied to cities and towns by pipelines. Pipelines are use for transporting crude oil, petroleum products and natural gas from oil and natural gas fields to refineries, fertilizer factories and big thermal power plants. In addition, solids such as

coal and minerals are also being transported. It reduces the running costs. Cooking gas is also being supplied to consumers by pipelines.

In some parts of India, pipelines are used for tranportation.
1. Nahar Katia - Nunamati - Barauni Pipeline: This is the first pipeline in India. It starts at Nahar Katia of Assam and end at Nunamati. Later it laid from Guwahati (Assam) to Barauni (Bihar) and then Allahabad (Uttar Pradesh) to Kanpur. The main pipeline further divided in to six various branches to supply different places. Of these, the Nunamati-Siliguri, Baurani-Halidia-Kanpur pipelines are noteworthy.

2. Salaya-Koyali-Mathura Pipeline: It extends from Salaya, Kacch District in Gujarat to Jalandhar in Punjab via Mathura, Delhi and Panipat. One of its branches stretches up to Koyali (Gujarat).

3. Hazira – Jagadishpur Pipeline: A gas pipeline from Hazira in Gujarat connects Jagdishpur in Uttar Pradesh via Vijaiypur in Madhya Pradesh. A branch pipe line of this has been extended to Mumbai via Sahajahanpur in Uttar Pradesh.

4. Mumbai High Mumbai - Ankleshwar - Koyali Pipeline: The pipeline has been extended to Pune, connecting Mumbai to mainland Mumbai. It also connects Ankleshwar and Koyali in Gujarat.

5. Kandla-Bhatinda pipeline: One of its branches runs from Mumbai to Manmad.

6. Vishakhapatnam to Vijaywada pipeline

7. Mangalore to Chennai via Bangalore.

8. Pipeline connectivity from Haldia to Paradip is under construction.

Slurry Pipelines:
1. Pipeline to transport Iron ore between Bailadila in Chhattisgarh and Vishakhapatnam in Andhra Pradesh.
2. Iron ore transported from the Darmukh of Karnataka to Mangalore port.
3. Zinc minerals and zinc products are being transported through the Dewar Udaipur pipeline in Rajasthan.

Waterway Transportation
Inland Waterway: India is one of the largest penninsula in the world. It has more than 7516 km. of coastline. It has 250 small ports in 7 major ports. Transportation by lake, backwater, river, creek and canals is called inland transportation. Waterways are the cheapest means of transportation. Water transportation is convenient to carry bulky and heavy goods. It is a fuel-efficient and environmentally friendly mode of transport. India has inland navigation waterways of 14,500 km in length. Out of which only 3,700 km are navigable. It transports about 45 million tons of goods annually.

In addition, the Overseas waterway is operating between India and Bangladesh since 1972. All of these are renewed in 1994. They are a) Kolkata - Pandu, b) - Kolkata - Karimganj (c) Rajsahi - Dhuliana and (d) Pandu -Karimganj.

Currently, to connect Arabian Sea with Bay of Bengal via Palk Strait, a bridge is being constructed called Ramsetu under Ramsethu Yojna. So that the ports on the east coast of India can be connected to the ports on the west coast.

In addition, inland transportion is also being carried through some of the main canals. These are

a) Bakimham Canal - from the Komanur Canal to the Mirakanam in the Krishna River Delta,
b) The Kumbar Zuari Canal connects the Mandadi River and the Zuari River.
c) Vedaranyam Canal connects Nagapatnam port with Vedarnyam
d) Narmada - connects the river mouth of the Tapti River
e) Connects the reservoirs of rivers that falls into Arabian sea in the west.

By sea: India's foreign and coastal trade is done by sea. The length of the coastline of India is 6,100 km. The coastline has 12 major ports in the country, namely Kolkata, Haldia, Paradeep, Visakhapatnam, Enor, Chennai, New Tuticorin, Kochi, New Mangalore, Marmagao, Mumbai, Kandla and Nabseba. Besides India has about 200 small and medium-sized ports. 95 percent of the country's total foreign trade is done by large ports only. The Shipping Corporation of India is the only Nationalised company in the country for trade and ship management. Other domestic shipping companies are also functioning in India for transportation through ships.

India's maritime trade is mainly through four sea routes.

1. India trades with the countries of the European continent through the Suez Canal.
2. The West African and South American countries trade with the Cape of Good Hope.
3. Through the Singapore Sea, India trades with Southeast Asia, Japan, the United States and Canada.
4. Trade with Australia and New Zealand through the Malacca strait.

The largest number of passengers and goods arrives through the port of Mumbai. So it is fair to call Mumbai the Gateway of India. In India, import of goods is more than the export. If India would have exported not only raw materials but also the indigenous products, then our national income would have been increased and improvement people's livelihood taken place.

Air travel:

Travel by air takes the least time but is costly. It is convenient to reach inaccessible, remote and dangerous places by air. Air transport can cover very difficult terrains like places of natural disasters, floods, famines, earthquakes, epidemics, dense forests and warfare. Prior to independence, air transport was operated by private companies. In 1953, two corporations, Air India (AI) and Indian Airlines (IA), were nationalized as civil aviation transport. The two companies are now jointly operating under the name Air India.

Air passengers and goods are carried by the International Civil Aviation Authority, Air India under the Civil Aviation Corporation. But the second corporation manages flights with countries in the Middle East and Southeast Asia, besides domestic flights. Currently India has 45 airports. Out of these 95 are operating while 29 not which includes 14 international airports. (See: Map of India Major ports and Internation Airports)

Many private airlines started their business as air traffic is opened for them. Some of these companies are Sahara Airlines, Deccan Chatter, Vistara, Air Asia, Jet Airlines, Indigo and Go Air etc.

There are two types of airports operating in the field of civil aviation. For example: - International airports and domestic airports. International airports are located in Delhi, Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Ahmedabad, Jaipur, Amritsar, Gowhati, Thiruanantapuram, Panaji, Kochi and Srinagar. There are 63 domestic airports in the country. These are entrusted to the Airport Authority of India.

Currently, India is planning to privatize its airports and arrangements are being made to provide more facilities and safety to passengers. Arrangements are done for landings and takeoff of flights at night.

Communication: - Communication is very important for human life, it is difficult for a person to survive without mutually exchange words. In the past, human relationships were limited, and this was possible only in figurative language or face to face interaction. Now communication has increased and the medium has also changed. But the pace of change, has been rapid in modern time, hence change in mode of communication and transportation. Now we can get information about what is happening anywhere in the world in a timely manner through telephone, fax, television, mobile phone, wireless and internet.

Today, the distance has been reduced and the world is shrinking due to the improvement of transportation and communication. Communication can be divided in to two parts, Personal Communication and Mass Communication.

Personal Communication: In 1854, India has 700 post offices operating in different parts of the country under Postal Department of India. Later Telegraph department was included and it became known as Posts and Telegraph Department. In 1984, the posts and telegram department has divided into two departments, the Postal department and Tele Communication Department.

Postal services provide a variety of services to the public. Distribution of letters, parcels is its main function. The postal department is responsible for delivering letters domestically, as well as letters from overseas and sending mail to abroad. Telephone service has also increased significantly since independence. Telephone service is now available in all metropolitan areas, all cities and large villages. With the increase of telephone services within the country, telephone connections have been established with many overseas countries around the world. Nowadays, people living in major cities are able to establish direct telephone communication with many foreign countries directly with ISD (International Subscriber Dialing). In addition, telecom (mobile, Internet, etc.) service systems have been introduced.

Mass Communicetion: The mass media plays an important role in informing the public about the various policies and national programs/schemes of the country. It also offers a variety of entertainment programs, besides news coverage. Radio, TV, Newspapers, magazines, books and films are the main sources of mass communication. Many people can watch the programs at the same time. So it is called the mass media.

Prasar Bharati (Broadcasting Corporation of India) is run by the Government of India and has two subsidiaries, Akashwani (All India Radio) and Doordarshan(Television).

*****All India Radio has about 200 stations in the country. It delivers various programs in national and provincial languages, for cities and rural areas. Special programs are also being promoted for the military, women and children, youth, students, tribal communities and workers.

*****Doordarshan (Television) is one of the world's largest mass media as it is being audio-visual media, it impacts the people and hence is the most powerful and best means of communication. This media is available to 90 percent of the total population.

*About 42,000 newspapers and magazines are published in India every year. These are published daily, weekly, monthly, or annually. The Gujarati daily "Mumbai News" published in Mumbai is the first newspaper in the country. Newspapers are published

in about 100 languages and dialects in our country. Hindi language has the highest number of newspapers. It is followed by English and Urdu.
***** There are four news departments operating in India. These are Press Trust of India, United News of India, Samachar Bharati and Hindustan Samachar. The first two news departments broadcast news in English and the last two in Hindi and other Indian languages.
* India is largest producer of feature films in the world. It produces video feature films, short films, video short films, and films. The Central Board of Film Certification is the authority to certify both Indian and foreign films.

Nowadays, news can be spread quickly and easily on social media such as Twitter, Face book, YouTube, Instagram, WhatsApp and so on.

Trade:
We do not manufacture all the products that we use. This is not possible either. So you have to buy from someone else to meet your needs. Even the seller might not have produced these goods. A person who sells goods is known as a merchant or trader. The buying and selling of goods by merchants is called trade or business. Hence business is a mediating job.

Local businesses operate in small towns, villages and large cities. At the state level, there is also trade between states. Trade between different parts of a country is called inland-trade. Domestic trade is called inland trade while trade between two countries is known as International Trade. Inland Trade of the country takes place through its own currency whereas International Trade takes by the exchange of currency between two countries of different values. International trade takes place by various modes of transportation i.e. land, water and air.

Export and Import is the main component of International trade. The difference between export and import is called the **Balance of Trade**. When the value of the goods exported exceeds the value of the goods imported, it is favourable balance of trade which is economically beneficial to our country. On the contrary, if the value of imports exceeds the value of exports, it is termed as unfavourable balance of trade. Such an adverse system has witnessed by our nation since the last decade of the previous century.

Prior to independence, India had trade relations with few countries, including the United Kingdom and Commonwealth countries. Today, India has established trade relations with almost all countries, major trading blocks and all geographical regions of the world. Our trading with oil producing countries, the European Economic Community (EEC), the Eastern European countries, the United States, Japan, Russia and other countries is especially on the rise.

India mainly exports industrial products, agricultural commodities, cottage industrial minerals (Ore), engineering products, grains and spices, leather goods, jute products, tobacco leaves and cashew nuts. Similarly, commodities imported into India include petroleum, petroleum products, pearls and Precious Stones, gold, silver and chemicals.

Work for you
Make list of major ports located on the east coast and west coast of India.

Problems in Urban communication and its Remedies:
Traffic jam is the main problem in major cities. Increasing number of four-wheeled vehicles is responsible for this. Despite many efforts, the issue has not been resolved. However, at the government level, various plans are being implemented to control traffic within the city.

Bus/Heavy Vehicles Lane:
Bus/Heavy vehicles routes have been planned in major cities of the country to facilitate the increased number of vehicles and the commutation. It is intended for easy and fast transportation within the city. As a result, people will be interested to use the public transport system.

With the implementation of this project, the widespread use of the public transport system will be possible. It is important to pay attention to the following aspects:
(a) Implementation of various incentive schemes to encourage the use of public transportation.

(B) It is mandatory for all large vehicles (Mo Bus also) except for relatively small and medium-sized cars must follow specific rules to travel in designated routes. This is because the bus route is empty most of the day.

(C) Strict rules are required for two-wheelers and three-wheelers to run in the intended direction.

(D) Foot over bridge is required to be built for Pedestrians.

(E) Traffic signals at each intersection/cross roads must be accurately determined keeping in mind the amount of traffic on each road during very busy hours. As a result, unreasonable delays in traffic and temporary violence among the commuters can be prevented.

Work for you : Organize various slogans and poster competitions to create awareness and interest among people about the use of public transportation system.

. Understanding the special needs of the road for the elderly, the disabled and the minors:
1. Keeping in view the needs of different sections of the society and people with disabilities, it is important to focus on infrastructure development in urban areas with appropriate planning so that everyone can use all kinds of roads, railway stations, foot path to reach their destination easily without facing any problems. Ramps are to be arranged for the movement of the physically challenged people.

2. Steps should be taken to ensure passengers can easily reach bus stands, airports and railway station along with their belongings, foot bridges are not broken and there should not be any traffic jams on the roads.

Development gives a person an opportunity to achieve financial goals with lot of freedom. This led to an increase in the number of motorists in urban areas, as well as the number of reckless drivers and children under the age of 18. Alcohol consumption has risen sharply. As a result, traffic accidents in our country have risen alarmingly. Strict and exemplary penalties are needed to impose in order to prevent such incidents, and public awareness is essential. By doing this, we would be able to save valuable human life and reduce losses.

1.Answer the following questions.

(i) Describe the benefits of transportation.
(ii) Describe the various types of Indian Roadways.
(iii) What do you mean by National Highway? Give a description of the national highway.
(iv) Give a description of the 'Border Roads Authority'.
(v) Describe the steps being taken by the Government of India to improve the roads.
(vi) Describe "The Indian Railways".
(vii) Provide information on India's pipeline transportation.
(viii) Write about the Indian Air Service.
(ix) Give a description of the Indian trade.

2. Write a brief answer to the following questions –

(i) What is meant by "transport"?
(ii) Why is communication important?
(iii) What are the 4 types of communications?
(iv) What do you mean by mass media?
(v) What is the state highway?
(vi) Name the three mass media.
(vii) How many railway zones are there in India?
(viii) Name the two rivers suitable for water transport in India.
(ix) How transportation strengthens the sense of unity of the country.
(x) List the four major ports on the east coast of India.
(xi) Which category of road covers the wide road from Manali in Himachal Pradesh to Leh in Ladakh?
(xii) What is Golden Quadrilateral means?
(xiii) Name the 6 international airport of our country.
(xiv) Write down the names of 4 news channels in India.
(xv) List the 4 items exported from India.
(xvi) What is Balance of Trade?
(xvii) Give an overview of the countries in which trade in India is taking place.
(xviii) Write the name of the oldest national highway.
(xix) Write in which states the ports of Haldia, Tuticorin and Kandla are located.

3. Distinguish between

(a) Transportation and Communication (b) Railways and Roads
(C) Imports and Exports (d) Intermediate and External Trade
(e) Broadways and Meter Gases (f)Inland Waterways and Sea Waterways (g) Indian Airlines and Air India

4. Give reasons –

(i) The transportation system is called the lifeline of the country.
(ii) Air transport is essential for inaccessible areas.
(iii)Petroleum transportation is facilitated by pipelines.
(iv) Roads are the most important of all transportation systems.

5. Link the railways in column A to the relevant head office in column B.

'A'	'B'
(A) East - Coastal Railway	Gorakhpur
(B) Eastern Railway	Maligaon
(C) North-Eastern Railway	Bilaspur
(D) North-Eastern Railway	Kolkata
(E) South-East Central Railway	Bhubaneswar
(F) South - Coastal Railway	Vishakhapatnam

6. Point the following locations on India Map.

(a) The national highway passing between Delhi and Mumbai via Bhopal.
(b) North-South Corridor National Highway.
(c) Inland waterway between Allahabad and Kolkata
(d) Kochi, Vishakhapatnam, Nhav sheva, Mangalore and Kolkata port

7. Choose the correct answer

(a) The distance between the two concepts on the Broadway railway is ____ meter.
(0.72, 1.6, 1.67, 1.76)
(b) Southwestern Railways Headquarters is located in _____
(Mumbai, Jaipur, Bilaspur, Hubli)
(c) India trades with the South American countries through _____sea.
(Singapore, Cape of Good hope, Suez Canal, Australia)
(d) There are _____ major ports in India. (10, 11, 12, 13)
(e) India has _____ place in the world in filmmaking. (First, Second, Third, Fourth)
(f) India has largest number of newspapers published in ____ language.
(English, Hindi, Bengali, Malayalam)

UNIT - II
LESSON – 1 : PRICE RISE

(A)PRICE RISE: Now a days, while buying different goods from the market we observe that, how prices are increasing day by day. What is the reason for this? What steps the Government takes to control such Price Rise? In order to understand this we have to discuss the various factors leading to such price rise.

Firstly, what is price rise? How to calculate it? Generally, two methods are used to calculate price rise, namely 1. Wholesale Price Index and 2. Consumer Price Index.

(1)Wholesale Price Index : the Wholesale Price Index is related to all the important goods procured in the country. In order to calculate the wholesale price index, about 460 products are taken into account in our country now. In order to calculate the Consumer Price Index the products used by consumers are taken into account. Generally this is calculated, taking into account of different products used by different Consumer Groups Price is determined as per the Price Index. The price of different types of goods and services in any subsequent years are taken to calculate the rise in price for that particular year. The year whose price is taken as 100, is called the Base Year. For example, if the prices of goods and services increases by 25% in the next year, then the Price Index of that year (2^{nd} year) is said to have increased from 100 to 125. An increase in the wholesale price index of the country is not a good sign. This has a negative impact on the production of the country. As a result, the consumer price index increases and at the same time, the different types of goods we buy become dearer and it influences our daily life.

REASONS FOR PRICE RISE : Price Rise occurs due to various reasons. Two main reasons out of this are mentioned below.

1. When the demand for a particular commodity is more than it's supply, it leads to a rise in price of that commodity. When there is a rise in the prices of raw-materials, wages and transport costs etc, there is a rise in price of different goods and services.
2. At times, due to unlawful activities of ant-social elements there is a rise a price of different commodities. Sometimes black-marketeers, hoarders etc. raise the price unnecessarily unlawfully hoards any commodity, that leads to artificial scarcity of the commodity in the market. That commodity is not available in the market as per the demand of the consumers. As a result there is a sharp rise in the price of that commodity. The profit hankering businessmen and hoarders are responsible for such price rise. These people, by violating Government rules hoard any commodity in their own godowns and created artificial scarcity, thereby exploiting the consumers.

IS THERE ANY NECESSITY TO CONTROL PRICE RISE? :

Generally, a rise in price is not beneficial for the country. This obstructs the development of the country. But all types of price rise do not obstruct development. A small rise in price is beneficial for the country, because by this the producers are able to earn a little more and they try to produce more amount of such goods. This also leads to an increase in the wages of the labour force engaged in factories. But a gradual rise in price creates opportunities of profit for the businessmen. So some profit hankering and dishonest business people, taking advantage of this rise in price, create artificial scarcity in the market by unlawfully hoarding such commodity and they earn more and more profit by selling them at higher price. A price rise generally influences the normal way of life of the consumer. A rise in the prices of artificial of daily use like, rice, dal, oil, wheat, milk etc affects the consumer adversely. For that reason, the Government takes various steps at different times, to control the prices of various commodities. Those are discussed below:

1. **MONITORING MEASURES :**
   When there is a rise in price in the country, India's central bank, The Reserve Bank of India, decreases the money in circulation. As a result of this policy of the RBI, the amount of money with the public gets reduced and that reduces the purchasing power and spending capacity of the people. By this price rise is controlled to some extent.

2. **FISCAL MEASURES ;**
   In order to control a price rise the Government imposes different taxes at various times, this tax is levied generally on the high-income-group and on various consumer goods. As a result of the taxes, the purchasing power of the people and their disposable income get reduced, this helps in controlling the price rise.

3. **PUBLIC DISTRIBUTION SYSTEM:**
   During price rise, the Government supplies articles of daily use to people through the public distribution system. Generally the PDS is meant for poor people and those who are below the poverty line (BPL). Articles like, rice, oil, sugar, wheat and kerosene etc are made available at a rate, far below the market rare.
   Example : (supply of rice at a price of Rs 2/- per Kg in rural areas. By this the price rise is controlled to some extent.

4. **GOVERNMENT ADMINISTERED PRICE :**
   During a price rise, the dishonest traders or producers unlawfully hoard various consumer goods. Because of their un-availibility, there is an unjustified price rise in the market. In order to control such situations, the Government generally fixes the prices of the goods of daily use and directs to sell them at that price. The Government generally adopts such a measure for articles like, potato, kerosene, sugar, petrol, cooking gas etc.

ANSWER THE FOLLOWING QUESTIONS

i. How is the Price Rise calculated?
ii. How many products in India are used for calculation of Wholesale Price Index?
iii. Who will face the problems if there will be an increase in Consumer Price Index?
iv. What situation will arise in the Market if demand of a commodity is more than its supply?
v. Name the India's Central Bank.
vi. Who is known as hoarder (stockiest)?
vii. When does Price of a consumer goods increase?
viii. What do you mean by public distribution system?

WRITE A SHORT NOTE ON THE FOLLOWING

Daily use products
Price rise
Wholesale Price Index
Consumer Price Index
Fiscal Measures to control Price Rise

LESSON 2

CONSUMER AWARENESS

We all play the role of either producers or consumers in the market. When we work in sectors like agriculture, industry and services etc we are considered as producers and when we buy goods or services from the market we are considered as consumers. A consumer is one who directly or indirectly satisfies himself by buying goods or services for use. We almost always buy some goods or other from the market daily. Example When we buy rice, potato, cereals, oil, vegetables, refrigerator, television, computer, etc we pay the price to the seller. But sometimes it is seen that the seller exploits us by giving us sub-standard goods or goods of lesser weight or fake goods or at times charging more than the standard price. So while purchasing different goods and services from the market we have to be careful about their quality, price, weight and measure. The Government has also framed various rules and regulations for the protection of the consumers about which we must have minimum knowledge.

Types of exploitation of Consumers:- Each one of us is a consumer. We at different times buy different types of goods or services from the market and in exchange pay the price. While the goods include rice, potato, cereals, cycle, refrigerator, car, computer, etc the services include banking, transportation service and insurance, etc. Nowadays various companies in order to increase the sale of their goods and services influence the consumers by using the newspaper, television, radio and internet, etc. Therefore a consumer while buying any goods or services from the market, should have adequate knowledge related to them, otherwise due to own ignorance. There is a possibility of being cheated very often by the seller.
The following exploitations may be faced:-

1. **High Price:-** The consumer is exploited due to a sale of a commodity at a price higher than the price fixed by the government. Unscrupulous traders unlawfully hoard some goods and create artificial scarcity in the market at different times and sell those goods at a higher price than the fare price, by which the consumer unnecessarily incurs loss and becomes the prey of exploitation.
2. **Less weight and measure:-** Very often it is seen that, the weight of goods sold in the market are incorrect. Unscrupulous trades by using fake weighing instruments and methods exploit the consumers be giving goods of lesser weight.
3. **Goods of sub-standard quality:-** Due to own ignorance the consumers very often face trouble by buying goods of sub-standard quality from the market. They do not get any benefit from the goods even after paying the

full price for them. At the same time by using those sub-standard goods there is a possibility of endangering their lives. For example :- there is a possibility of death while using fake medicines or sub-standard cooking stove or gas stove.

4. **Fake goods :-** Very often, due to ignorance, we get fake goods while buying the same from the market. Generally the quality of those fake or duplicate goods are lower compared to the original products. So by buying them the consumer is exploited instead of being benefited. Even though, for buying these fake goods , the consumers pay the same price as of the genuine goods.
5. **Adulterated goods :-** Now a days availability of adulterated goods in the market is a common affair. Adulterated goods are produced by mixing stones in rice grains, leather dust in tea dust, and kerosene in petrol are factual examples and by selling such goods in the market the consumers are exploited.
6. **Artificial scarcity :-** Sometimes, unscrupulous and profit hankering traders with an ulterior motive to earn unfair profit, unlawfully hoard different goods in their godown thereby creating artificial scarcity in the market for the consumers. Due to this the consumers are exploited by purchasing these goods at a higher price.
7. **Lack of safety symbol/ stamp on the products :-** It is desirable to have safety symbols or stamp on the products available in the market. But now a days many companies with a competitive motive do not use such safety symbols or stamp on their products while manufacturing and packing. Thereby the consumer after buying and using these goods face various accidents and at times even lose their lives.
8. **False or incomplete information :-** Producers and sellers at times, give some false or incomplete information about their products through advertising. Generally in these campaigns they do not express correctly about the quality, standard, purity, safety and expiry of the products which adversely endangers the health and life of the purchaser.
9. **Non-cooperation and dissatisfaction after sales service:-** Very often it is seen that the seller before selling some goods to the consumers promises to provide all sorts of after sales service to them. But the consumer becomes unable to get such services afterwards and faces different problems pertaining to its repair and usage. The after sales services for various stylish and luxurious products that we buy like television, motorcycle, computer, mobile phone, refrigerator, car, etc are not properly available now a days.

The reasons for Consumer exploitation :-

The consumers are exploited in various ways which are discussed below : -

1. Low literacy :- Low literacy is one of the main reason of consumer exploitation. The literacy rate in a developing country like India is very low. Therefore these consumers are not aware of the market condition like availability of different brands of product and their comparative quality/price.
2. Limited information :- It is unnecessary to bring to the notice of the consumers through media like newspaper, television and internet, etc, detailed information like the production cost of a product or service and the selling price of it by adding the overhead expenses to it. This type of market related knowledge is limited with the consumers of our country. Therefore here the consumers are exploited more and more.
3. Limited competition :- Generally in developing countries like India a few producers produce different commodities. Therefore a monopoly condition is seen in their fixation of price and supply of commodities. Due to this, the price in the market remains high and the consumer has to spend more unnecessarily. Under these conditions, the producers and traders become more powerful in fixation of price of different commodities.
4. Limited supply :- When the goods are not supplied as per the demand, the consumers are exploited. Taking advantage of this, producers and traders unitedly hoard different goods unlawfully and create an artificial scarcity in the market and exploit the consumer by forcing him / her to buy such goods at a higher rate.

Consumer Awareness :- Different systems were adopted to protect the consumers in the ancient times. A brief description of this is found in the "Artha Shastra" of Kautilya. In the modern age, after World War-II, for the protection of consumers the first consumer revolution started in England. Later in 1962, a notification was released regarding the rights of the consumers in the United States of America. Ralph Nader is the father of the consumer forum and revolution. The 15th day of March every year is being celebrated as the " World Consumer Rights Day".

The Rights and Duties of the Consumer :- Earlier it has been discussed as to how consumers are exploited by different producers and traders while buying goods and services from the market. It is necessary that the consumers must

be conscious about their rights and duties in order to be free from such exploitation.

Rights :- There is an elaborate description of consumer rights in the Indian Legal system. It includes correct information regarding the quality of different goods and services available in the market, their purity, usage and price, etc, freedom to buy goods and services from the market as per their own choice, the hearing of different consumer disputes and their correct and their correct and timely redressal. The consumer should always be eager to enforce these rights.

Duties :- In order to enforce the above rights, it is important that the consumers must be aware of their different duties. It is necessary to demand the money receipt/bills while buying any goods or services. Above all, they should enforce their rights through the Consumer forum or consumer organization against the exploitation of the traders.

The Consumer Protection Act and measures :- The Government has mainly adopted three measures for the protection of consumers, such as enactment of the Consumer Protection Act, application of the Act and the adoption of new technology in the field of Industrial development. The Government has enacted various laws in the Parliament and has simplified such laws many times through amendments in order to protect the interest of the consumers. Arrangement for distribution of articles of daily use has been made through the Public Distribution System. It has been made mandatory to affix the seal of quality over all the composite goods produced as per new technical rules in the field of Industrial Development. For the protection of consumers, the government has established a three-tier system in the District, State and National level. It is named as Consumer Dispute Redressal Agency. These agencies are to pronounce their judgement after hearing the grievances of the consumers within a period of three months. As per the Act, various departments related to consumer welfare and protection have been established in the State as well as in the Central Government for the protection of the consumers.

As per this Act, three-tier consumer courts have been established in our country. In the National level, it is called the National Consumer Commission. It's office is situated at New Delhi. The agency working in the State level is called the State Consumer Commission. It is situated in our state capital – Bhubaneswar and in the district level the consumer courts are called the District Consumer Forum situated in the district headquarters. In our country the 24th day of December every year is observed as the National Consumer Day. On this day of 1986, the Consumer Protection Act was passed in the Indian parliament for the first time. Inspite of the continuous development

seen in this field , it is progressing at a slow pace. It can be told at the end that, consumer protection and welfare can be achieved only through the active cooperation of the consumers.

EXERCISE

ANSWER THE FOLLOWING QUESTIONS

a) Why is Consumer Awareness necessary?
b) What do you mean by fake or duplicate goods?
c) In the Production Sector, when do you find a monopolize condition.
d) When did consumer revolution start in England?
e) When did the Notification of Consumer Right Act publish in United States of America?
f) Every year which day is celebrated as "World Consumer Rights Day".
g) What is District Level Consumer Court known as?
h) What steps are taken by the Parliament to protect consumers in India?
i) Write the functions of Consumer Disputes Redressal Agencies.
j) What do you mean by Consumer Rights?
k) What is the responsibility of a Consumer?

WRITE SHORT NOTE ON THE FOLLOWING

a) Adultered goods
b) Consumer Awareness
c) Substandard quality goods
d) Limited competition
e) Consumer court
f) Consumer Protect Act
g) Consumer Forum

LESSON 3

POVERTY

Like unreasonable rise in population and unemployment a great hindrance of economic development of India is "Poverty". Although there is a continuous rise in per capita income and national income in our country after independence yet the impact of poverty has not been reduced up to expectation. This has played the vital role in creating hindrance in our financial development of the nation.

Poverty

This is a curse for mankind. Under this condition one has to bear the shortage of the minimum necessities of life like food, shelter and clothing. This is a painful condition of man. Poverty stricken people live under pitiable condition in the outskirts of cities in outskirts of cities with half naked bodies, bare feet, thatched or polythene covered houses. Poverty means the incapacities to fulfill the minimum basic necessity like a developed standard of living, due health care and skill development, etc. Children of this class of society are seen on the streets and slum areas. Generally they suffer from malnutrition. These children are seen working in shops, restaurants, garages & hotels, etc from a very tender age. While travelling we see beggars begging on the street, in the train or in a bus. These people are poor.

Poverty can be judged from two angles such as :-

"Absolute Poverty" and secondly "Relative Poverty". The people who lack basic amenities of life suffer from absolute poverty. Absolute poverty is determined on the basis of the minimum necessity of life i.e minimum nutrition, clothing and a house for shelter. People who are unable to pay the minimum required price for these necessities are considered as below poverty line (BPL). This sort of absolute poverty is seen like a disease in India. The meaning of relative poverty is different. This mainly refers to the difference of income between two persons. Inequal distribution of income and wealth in the country leads to absolute poverty. This type of poverty is seen in almost all countries and this is not as serious a problem as absolute poverty.

Estimation of Poverty :- Both the Central and State Government have undertaken the responsibility of eradicating poverty from the country after independence. As the first step for this, an estimate of the number of people below the poverty line in our country has been prepared. The Planning Commission at the beginning of the sixth five year plan 1980-85 laid emphasis on the minimum calorie requirement for determining the poverty line in India.

According to this view the per capita calorie requirement per day per individual in the rural areas is 2400 calories whereas in urban areas is 2100 calories. The reason for the calorie-wise difference between urban and rural area is that a person in rural area does more physical labour in comparison to a person in an urban area. Converting this calorie consumption in monetary terms, the per capita monthly expenditure in rural areas has been fixed at a minimum of Rs 65/- and in urban areas at a minimum of Rs 75/- during the pre-sixth five year plan period. Later it has been increased to Rs 365/- for rural areas and Rs 539/- for urban areas. Those people whose income is less than the per capita income as aforesaid are considered as below poverty line "BPL". Detailed information regarding the present condition of poverty in the country has been published in the year 2001 by the Planning Commission. From this it is understood that the percentage of the poor in the country in the year 1999-2000 has been reduced in comparison to the year 1993-1994. 36% of the population in India were below poverty line in the year 1993-1994 which was reduced to 26.1% in the year 1999-2000. The following table shows the percentage of people below poverty line in the country and different states / union territories in the year 1999-2000. In Odisha the highest percentage of its population are below the poverty line. To express it numerically, 2.07 Crore people are below poverty line in Odisha. This BPL figure is 5.3 crore in Uttar Pradesh, 5.3 Crore in Bihar, 3 crore in Madhya Pradesh and 2.6 Crore in Maharastra.

TABLE –I POPULATION BELOW POVERTY LINE

YEAR	VILLAGES		CITIES		TOTAL	
	No	Percent	No	Percent	No	Percent
1973-1974	261	56.4	60	49.0	321	54.9
1977-1978	264	53.1	65	45.2	329	51.3
1987-1988	232	39.1	75	38.2	303	38.9
1993-1994	244	37.3	76	32.4	320	36.0
1999-2000	193	27.1	67	23.6	260	26.1
2004-2005	-	21.8	-	21.7	-	21.8

(SOURCE : ECONOMIC SURVEY 2009-10)

TABLE –II

POPULATION BELOW POVERTY LINE IN THE STATES AND UNION TERRITORIES. (IN %age) (1999-2000)

Sl No	STATE	POPULATION BPL	Sl No	STATE	POPULATION BPL
1	ANDHRA PRADESH	15.8	17	NAGALAND	32.7
2	ARUNACHAL PRADESH	33.5	18	ODISHA	47.2
3	ASSAM	36.1	19	PUNJAB	6.2
4	BIHAR	42.6	20	RAJASTHAN	15.3
5	GOA	4.4	21	SIKKIM	36.6
6	GUJARAT	14.1	22	TAMIL NADU	21.2
7	HARIYANA	8.7	23	TRIPURA	34.4
8	HIMACHAL PRADESH	7.6	24	UTTAR PRADESH	31.2
9	JAMMU KASHMIR	3.4	25	WEST BENGAL	27.0
10	KARNATAKA	20.0	26	ANDAMAN AND NICOBAR	21.0
11	KERALA	12.7	27	CHANDIGARH	5.8
12	MADHYAPRADESH	37.4	28	DADRA NAGOREHAVELI	17.1
13	MAHARASHTRA	25.0	29	DAMAN DIU	4.4
14	MANIPUR	28.5	30	DELHI	8.2
15	MEGHALAYA	33.9	31	LAKSHDWEEP	15.6
16	MIJORAM	19.5	32	PUDDUCHERY	21.7

As per the opinion of a Committee formed by the Rural Development Ministry, Government of India, the method adopted to determine the poverty line in 2004-05 (Rs 365/- in rural area and Rs 539/- in urban area) is faulty, because for the required calorie food value the Committee has fixed Rs 700/- for rural area and Rs 1000/- for urban area. Therefore the number of people below poverty line has increased. In the opinion of famous economist Tendulkar, the BPL population for urban areas is 40% and that in rural areas is 50%. The rate of poverty estimated in Odisha is 47%.

Causes of Poverty :- There are many causes of poverty in the country. Due to low level of income, low productivity people like farmers, labourers and rural people depending on them become victim of poverty.

Low level Income :- Generally most of the people in India are illiterate and poor. Their per capita income is at a very low level. They are deprived of eating wholesome food due to their low income. Moreover, this also reduce their

capacity to work. As a result, their income does not rise and they are steeped in poverty.

High Growth of population :- One of the main causes of poverty in the country is the rapid rise in population. By this, poverty takes an acute form. In India the annual rate of growth of population is around 2%, so the per capita income is low. By this, supply of labour increases leading to lower wage rate and the poor becomes poorer.

Unequal distribution of land and other assets :- Generally land and other assets (like Gold, Silver and company securities) are the source of income. A great inequality is seen in the distribution of these wealth and assets in our country. For these reasons the rich are getting richer and the poor are getting poorer. So marked decrease in poverty is not seen.

Low Productivity :-
Most of the people of rural areas are dependant on agriculture. As per estimate more than 65% of people depend on agriculture for living. Due to continuous rise in population of the country, the per capita land holding has been decreasing. In the year 1970-71, the average land holding per family was 2.3 hectares which has been reduced to 1.41 hectares in the year 1991-92. Added to this the rate of productivity of the land in the year 1991-92 in our country is lower in comparison to other countries of the world. As per a report in the year 2004-05 the hectare-wise production of paddy in United States, Japan and China is 73.7 quintals, 65.8 quintals and 62.7 quintals respectively in comparison to 29.1 quintals in India. Due to this the level of income of most of the people is very low. Due to the low income, inability to invest capital and low productivity by farmers, labourers and rural people depending on agricultural income become the victim of poverty.

Lack of employment opportunity :- Unemployment is a reflection of poverty. One of the main reasons of the rise in the number of unemployed in the country is due to the rapid rise in population. Moreover, we give emphasis on the economic development in our planning and unemployment has become an acute problem due to no significant changes in the techniques of employment generation which leads to increase in poverty.

Growing indebtedness :- Poor people in rural areas generally due to their low income, borrow money from village money lenders and others. The rate of interest charged by them is very high. Moreover, they borrow money by mortgaging their cultivable land and houses etc. In many cases, being unable

to repay the loan, they lose their land and houses and become victims of the debt trap of the money lenders thereby becoming more and more poor. So this happens to be another important reason for increase in poverty.

According to the estimate of famous economist Dandekar, 20% of the poor people in urban areas are villagers. They come to the urban areas leaving their village to earn livelihood. Majority of poor people in cities, are compelled to work with a low wage in different construction works and other establishments. So there is no improvement in their economic condition.

Poverty alleviation programmes :- From the very beginning of planning in India emphasis has been laid on eradication of poverty. Different steps have been taken in planning to reduce economic inequality and achieve growth, because lack of development and economic inequality are the two main causes of poverty. Different steps like abolition of Zamindari system in agriculture, fixation of land ceiling, distribution of excess landto the landless and small farmers have been taken. In the industrial front, attempts have been made to develop small and cottage industry along with large industries. Marked improvement is seen in community services like education, health, water supply, electrification, etc. The fourth five year plan (1969-74) and later from sixth five year plan (1980-85) work is being done accordingly as described hereunder :-

Integrated Rural Development Programme (IRDP) :- In 1978-79 the Government of India for the first time for the upliftment of the poorest families of the society implemented the Integrated Rural Development Programme. This is a main programme for eradication of poverty, based on self-employment. For this poor and poorest families in the rural areas are found out and financial assistance is given to the beneficiaries in the form of loans and grants for different types of income generating prepositions like cattle rearing, poultry farming, pisciculture, small industries and cottage industries, etc. Under this programme small and marginal farmers, landless farmers, village artisans, weavers and people of scheduled caste and scheduled tribes are included. Grants are given in different rates to the different types of beneficiaries. This grant is within 50% to 75% of the cost of project. This is maximum Rs 5000/- in case of scheduled tribes and Rs 4000/- in case of scheduled caste and Rs 3000/- for the the people of general category. This is a central government sponsored scheme.

Training Rural Youth for Self-employment (TRYSEM):- In 1979, the rural youth training scheme was started in the national level. The purpose of this scheme is to create self employment by imparting training and technical

education to the unemployed young men and women of rural areas and at the same time to motivate them to establish various enterprises. 50% of the young men and women must be scheduled tribes / scheduled castes as per rules. Moreover 40% of the total beneficiaries must be women as per the system.

National Rural Employment Programme (NREP) :- In rural areas majority of the families do not have any income generating asset. Mainly they depend on agriculture. They do not get employment throughout the year as agriculture is a seasonal profession. In 1977 for the first time the Government of India took steps to solve this problem of seasonal unemployment by the National Rural Employment Programme. Different infrastructural work in rural areas like ponds, libraries, schools, roads, flood control, minor irrigation project and bridges, etc have been created by rural labourers through this programme.

Rural landless Employment Guarantee Scheme (RLEGS) :- This programme was started in the year 1983. Earlier, this was executed as a supplementary programme of the National Rural employment Programme. The main aim of the programme, is to create more employment in rural areas along with improvement in the quality of rural life. Under this programme at least one person from the family of landless labourers in the rural areas is guaranteed employment for 100 days in a year. This programme works with 100% assistance of the central government. In 1989, both National Rural Employment Programme and the rural landless employment guarantee scheme were merged together and the Jawahar Rural(Samrudhi) Rojgar Yojana was launched. The purpose of this is the simplification of the different poverty alleviation programmes.

Jawahar Rojgar Yojana (JRY) :- The main purpose of this programme is to provide employment to the poor rural agricultural labourers when there is a slow down of agricultural activities. Mainly the families below the povert line can be included in this programme. Both employed and partly employed men and women can be the beneficiaries under this programme and its speciality is that, it is to be implemented through the gram panchayat. 80% of the cost involved in this programme is provided by the central government whereas 20% is provided by the state government.

Employment Assurance Scheme (EAS) :- In 1993, as per the recommendation of the National Development Council this Employment Assurance Scheme was launched. This is a common programme covering all the rural development blocks of the country. The main aim of this programme

is to provide 100 days guaranteed work to the rural unskilled labourers in a year.

Development of women and children in Rural Areas (DWCRA) :- This programme has been launched for the development of the rural women and children. The target of this programme is the economic and social development of the women. If the women in a group attempt to start any income generating project, then they are motivated and thereby get financial assistance through this programme.

Swarna Jayanti Sahari Rojgar Yojana (SJSRY) :- In 1997 the Swarana Jayanti Sahari Rojgar Yojana has been launched by combining the earlier prevailing poverty alleviation schemes like – Nehru Rojgar Yojana, Sahari Maulik Seva Yojana and the Prime Ministers integrated Urban poverty eradication programmes. The aim of this programme is to provide employment to the urban unemployed in high income generating projects. Under this programme one is motivated to establish different projects by self employment or be employment of labour. Under this two programmes of special type are operated :-

a. Urban Self employment programme (USEP)
b. Urban Wage employment programme (UWEP)

Prime Ministers Rojgar Yojana (PMRY) :- In 1993, this programme was launched for creating employment opportunities and facilities for the unemployed and partly employed. As per this programme, arrangements have been made to provide a grant of 15% subject to a maximum of Rs 7500/- of the cost of the small enterprise to young men and women in the age group of 18 to 35 years.

Swarna Jayanti Gramya Swarojgar Yojana (SGSY) :-

As the various poverty eradication programmes operating in rural areas could not fulfill their main purpose and therefore to make them more effective and fruitful, the Government of India as per the recommendation of the Prof. M.R.Hasim Committee decided to execute the self-employment programmes only through the IRDP. Again as per the recommendation of the said Committee the government has launched the Swarna Jayanti Gramya Swarojgar Yojana in 1999 by combining all the earlier programmes like the IRDP, DWCRA, TRYSEM and MWS.

National Rural Employment Guarantee Act 2006 :-

In the year 2005, the government in order to assure employment opportunities to the poverty stricken rural families enacted the National Rural Employment

Guarantee Act 2006 (NREGA). In the first phase, this has started operation in the 200 backward and underdeveloped districts in the country. There is a target to cover the whole country under this programme within the next five years.

There are many causes of poverty in India. The main causes of poverty are said to be low income level, increase in population, lack of employment opportunity, uncertainty of agriculture and low production, inequality in distribution of land and other assets. But the spread of corruption is, above all, the reason and responsible to a greater extent for the failure of all the schemes.

EXERCISE

ANSWER THE FOLLOWING QUESTIONS

a) What is the minimum required food of a man is known as?
b) What do you mean mass-poverty?
c) How much per capita calorie required per day per individual in the rural areas?
d) How much per capita calorie required per day per individual in the urban areas?
e) In Odisha, how many people were there below poverty line in the year 1999-2000.
f) What are the objectives of Integrated Rural Development Programme?
g) Write any 2 self employment programmes implemented under Poverty Eleviation Programme.
h) Write about the reasons behind the Poverty in India.
i) When did Development of women and children in Rural Areas (DWCRA) implement in India?
j) What are all various programmes launched through Prime Minister's Rojagar Yojana Scheme?
k) What is main objective of Jawahar Rural (Samrudhi) Rojgar Yojana?

WRITE A SHORT NOTE ON THE FOLLOWING

a) Integrated Rural Development Programme (IRDP) and National Rural Employment Programme (NREP)
b) Absolute Poverty and Relative Poverty
c) Training Rural Youth for Self-employment (TRYSEM) and Swarna Jayanti Sahari Rojgar Yojana (SJSRY)

WRITE IN BRIEF

a) Why the number of poor more in Rural Areas (Villages)?
b) Main objectives of Integrated Rural Development Progrmme.
c) How is the poverty estimated?
d) What is National Rural Employment Guarantee Act?

e) What is Swarna Jayanti Gramya Swarojgar Yojana (SGSY)?

LESSON 4
UNEMPLOYMENT

Unemployment is the main hinderance in the economic development of a developing country like India. To create more and more employment opportunities different programs have been taken up during various five year plan periods. Still then, there is a rise in the number of un-employees. In 1951, during the first five year plan period, the number of un-employees in the country reached at 3.3 millions. The various steps taken to reduce unemployment in India are discussed below.

Unemployment problem in India is generally judged from three angles-

1. The labour force of the country is a small portion of the total population of the country.
2. A majority people of the labour force, those who are fit-to-work are either unemployed or partly-employed.
3. The productivity of the labourers who usually get employment are low or meager.

1.The labour force of the country is a small portion of the total population
The number of labourers in the country is 39.3% of the total population as per sensus of 2001. As per 1991 senses it was 37.6%. The National sample survey has calculated the labourer-population ratio as 42.75% in 1993-94. The number of women laboureres in the total labour-force of our country, is much less in comparision to other advanced countries. As per the sensus of 2001, the total number of women labourers was 25.75% in the country.

2.Unemployment or Partial unemployment :
As per an estimate, the number of unemployed labours is more in rural areas as agriculture is seasonal in India and there is no marked development in non-agricultural activity in the country.

If an able person is not engaged in any productive work, then he is called unemployed. If employment is viewed from the angle of income, then it is seen that a labour may be employed in some field, but he is poor because his income from it is not sufficient. In other words, an unemployed labourer may be compelled to join in any job but that employment is not upto his choice or it has any relation to his capability, experience and training. Generally, the number of such labourers are more in urban areas.

3.Low productivity of employment:
There are two sides of the problem of employment, such as (1) Quantitative and (2)Qualitative.

The existence of less labourer force in comparision to the size of population of the country is it's quantitative side whereas the productivity of the labour force is it's qualitative side. In comparision to the productivity of the labour force of advanced countries, the average productivity of our labourer is very less. While, labourers of the developed countries se advanced and modern equipments. Due to low productivity, their income is also low.

Therefore, for them a rise in the standard of living is not possible and they continue to live in poverty forever.

Types of unemployment : Generally unemployment is of five categories, such as seasonal unemployment, disguised unemployment, frictional unemployment, organizational unemployment and technological unemployment.

1.Seasonal Unemployment – This type of unemployment is more seen in agrarian country like India. These labourers do not get any employment in most of the days in a year. The reason for this is that, in our country, agriculture is dependent on monsoon and irrigated land is very less. So the working labour force in rural areas, get employment only during the period favourable for agriculture and remain unemployed in other times. This is called Seasonal Unemployment.

2.Disguised Unemployment – In this type of unemployment, more number of people are employed than the required number. Under this condition, if the excess labourers are retrenched, then it will have no impact on the production. In India, this problem is mainly seen in agricultural sector in rural areas. For example, when one or two labourers are required to grow crop in an acre of agricultural land, and if the other eight persons of the same family are engaged in it, then the surplus nine labourers are called disguised unemployees. This type of situations arises, as there is less possibility of other employments in rural areas. However, this type of unemployees are also seen in urban areas. For example : Rickshaw pullers. More than the required number of rickshaw pullers are engaged in the work.

3.Frictional Unemployed : at times, the demand for many commodities in the market decreases due to technological advancements and introduction of new methods in the industrial front, for which the industrialists stop production of such commodities. At that time, the labourers engaged in the production of such commodities are retrenched and they remain unemployed till they are engaged in some other work. These types of unemplyees mainly seen in industrially advanced countries.

4.Organisational Unemployment : If in a financial system, the employment of labourers are affected due to lack of resources or capital, then that is called

Organisational unemployment. This type of unemployment is generally seen in developing countries like India.

5.Technological Unemployment : Now a days, in many countries, labourers are being replaced more and more by machineries, for achieving higher production for economic growth. By this some labourers become unemployed. Generally, we seen that, employment in the field of agriculture and industry is getting reduced due to the introduction of tractors and other machineries in agriculture and computer in trade and industry. This is harmful for populous country like India. Sometimes, many people do not get employment even if they are having educational qualifications. This type of unemployment is called Technological unemployment. This type of unemployment is also seen in other countries. This type of unemployees are more in urban areas as the scope of education is more in urban areas than in rural areas.

Various steps and programs for eradication of unemployment :
In India, various programs have been taken up to solve the problems of unemployment through different five year plans. To eradicate this problem, some strong steps have been taken up from the Sixth Five year plan period. Many programs have been taken up in order to provide employment opportunities to different types of unemployees. Those are included in the programs taken up for eradication of poverty.

The aim of these programs is to develop various infrastructures in rural areas through different schemes along with to create more employment. Moreover, arrangements are made through these programs for their skill-development. In our country, in order to train the unemplees, the State Government has established different industrial training centres and has also included different vocational and technical courses in school education. By this, the students passing out from schools will get more employment opportunities in future. The banks have also made arrangements to provide loans for establishing more and more industrial and business organizations. This will be helpful in creating more employments in the country along with it's industrial development.

EXERCISE

ANSWER THE FOLLOWING QUESTIONS

a) What is the main reason behind the unemployment situation in India?
b) In which year did First Five Year Plan implemented in our country?
c) What do you mean by disguised unemployment?
d) What do you mean by partial unemployment?
e) Why is number of Rural Unemployment more than that of Urban unemployment?
f) What are all the various steps taken by the Government to eradicate unemployment?

DIFFERENTIATE BETWEEN

a) Unemployment and Partial Unemployment
b) Seasonal unemployment and Organisational Unemployment
c) Frictional and Technological unemployment

WRITE SHORT NOTE ON

a) Disguised Unemployment
b) Seasonal Unemployment
c) Organisational Unemployment
d) Unemployment eradication programme
e) Solutions for unemployment programme

ANSWER THE FOLLOWING LONG QUESTIONS

a) Write the various reasons of unemployment in India.
b) Write briefly about the various types of unemployment.
c) Write about various steps and programs implemented to eradicate unemployment?

UNIT - 1
ECONOMIC DEVELOPMENT

Economic development is a much publicized word. It is used in various fields, such as : to get clear picture of the financial system of any country we have to look into the economic development of that country. The foundation of development in any country solely depends upon its economic development. Economists divided, all the countries of the world on the basis of economic development, such as developed countries and developing countries. The developed countries are United States of America, Germany, France, England, Japan etc. and countries like India, Pakistan, Sri Lanka and Bangladesh etc. are regarded as developing countries. We have to remember here that, the population of developed countries is in a controlled state and their per capita income is also high. But the main problem of the developing countries is their rise in population. Due to their inability to control the population growth, there is much pressure on their resources and at the same time, there is no marked improvement in their per capita income. For these reasons, the standard of living of the people of developed countries are very high and advanced, whereas the standard of living and income of the people of the developing countries are of a lower standard.

ECONOMIC DEVELOPMENT AND IT'S CRITERIA

We generally understand economic development as economic growth because economic development is possible only by financial growth. Financial growth becomes possible only, if there is a continuous increase in per apita income and national income, and economic development is possible only when there is economic growth. But we should remember here that, financial growth cannot be considered as economic development, because the examples of economic growth are considered to be, the standard of living of the people and improvement in their financial status, social and cultural development.

The total National Income and the per capita income are considered as the basis for measuring economic development. The Gross Domestic Product or GDP of a country is the sum total of the money value of the total production of goods and services in a particular year and the income from external sources like export. The per capita income of any country can be determined by dividing the GDP with the population of that country. It is noteworthy to mention that, the role of the population of a country is very important to determine the per capita income of that country. Because there are many countries in this world, whose GDP is equal to or less than that of India. but since their population is less than India, their per capita income is far higher than that of India and therefore they are developed. As per the data released by the Central Statistical Organisation, the GDP of India in the year 1950-51 was Rs. 1,32,367 crores, whereas, in the year 2003-04 it was Rs.12,66,005 crores and in 2010-11 it was Rs 48,85,954 crores. From this, it is clear that, while our per capita income in 2003-04 was Rs.36,871.1=00 in the year 2010-11 it has risen to Rs.53,331=00. Each country of the world, in order to develop the

standard of living of it's people devise various financial policies such as Capitalism, socialism and mixed economy. India is following the policy of mixed economy after independence. It is a combination of both Capitalism and Socialism. Here, agriculture and industry are privately owned by individuals with the sole aim of making profit, whereas, various enterprises owned and managed by the Government are also engaged in the production of goods and services such as the department of Railways and Department of Post etc. They work with the aim of public welfare. There is a good relationship and cooperation between these two sections (Private and Public sectors).

The extent and types of India's Economic Development : India is a developing countries. The economic condition of India was very precious during the British Rule. The then English rulers did not take any step for the economic development of India. The Government of India has taken various steps, through it's Five Year Plans for the economic development only after independence. Various measures such as : abolition of Zamindari System, providing land to land less agricultural labourers and fixation of the land ceiling, have been taken by the Government of India, in oreder to raise the agricultural production and be self-sufficient. Various large, medium and small irrigation projects have been established in order to increase the are of irrigated land. In Gram Panchayat Level, different training programmes are being organised, in order to educate farmers on application of new methods of cultivation. Different banks are also providing long and short term loans to farmers, for development of agriculture. After1948, a new industrial policy has been implemented for rapid industrial development of India. Along with, reserving specified sectors for the Government different facilities like, concession in tax, getting easy bank finance and importing raw-material etc have been given to the private entrepreneurs. During the sixties, India has achieved success in the Green Revolution and has become self-sufficient in production of food grains. The country has also achieved significant development in the industrial sector and has built a strong industrial infrastructure.

The scope of different service sectors like Banking, Railways, Postal and Insurance has increased.

NEW ECONOMIC POLICY (1991) :

A new economic policy has been initiated after 1991 and accordingly various activities have been undertaken. The specialities of this policy are : Liberalisation, Privatisation and Globalisation.

India has accepted mixed Economy Policy after independence. As per this policy both Private and Public sectors are working in cooperation for the Economic Development of the country. For which the country has achieved a marked success in industrial development. During 1948-1990, the country could achieve a marked success in both scientific and industrial sectors along with a strong industrial infrastructure. At that time the share of agriculture

and primary sectors decreased and the importance of industry and other service sectors increased, in relation to the total domestic product of the country. But at the same time a failure was observed in various sectors. Due to the excessive Government Control, the private sector could not achieve the desired target in the industrial development. It was also observed that, in some cases the efficiency of various public enterprises declined and the amount of loss was also increased. This resulted a great hindrance in the economic development of the country. During that time, the economic condition of the country gradually become weak and it led to an economic crisis. The foreign exchange reserve of the country declined alarming rate. This led to such a situation that, the Government was unable to pay salary to it's employees and was compelled to pledge the gold reserve of the country with the Bank of London, to get loans to manage it's affairs. Then the growth of National Income declined to 0.8% only and inflation rose to 12%. Due to these reasons the Government adopted the new Economic Policy in 1991 in the Country.

1.LIBERALISATION

Liberalisation is a policy where, the various restrictions are imposed upon the export and import of industrial sector, like license fee, tax etc. are removed or exempted. It also includes granting freedom to domestic entrepreneurs and multinational companies in the matters relating to choice products, amount of production and place of production. Now, a time has come, where we find that, no country is having monopoly over any product or technical knowhow. All the quality goods and products of famous brands are now available in almost all Countries. This has been possible due to the liberalization policy, with the support of some very powerful orgainsations like the World Trade Organisation (WTO). This policy of liberlisation has been implemented in many countries of the world. Till now 150 countries are it's members and this organization is formulating rules in the field of world trade and taking steps for their proper implementation.

2.PRIVATISATION

Privatisation is another important aspect of the new economic policy. The failure of various public sectors enterprises in various fields is responsible for the introduction this policy. Under this policy, the private entrepreneurs are motivated to compete with public enterprises in various fields. The public sectors has got monopoly rights over 18 areas.

3.GLOBALISATION

This type of economy is a market-based economy. India has joined with the global union in the areas of production, trade and investment, after this was introduced in India. the various Governmental restrictions imposed on foreign companies have been extensively liberalized, for facilitating the foreign and multinational companies to invest more and more in Indian industries, set up new industries in India and supply their foods and services, produced in other countries to India. Likewise the Indian entrepreneurs have been permitted to invest in foreign companies, setup new industries in other countries and sell

their products produced in India in other countries. The Government of India has taken various steps like liberalizing some taxes and restrictions imposed earlier. It has also been taken steps like reducing tariff rates in some areas and granting exemptions of taxes. The following are some of the examples of such steps.

EXAMPLE : The production and working method of the Multinational Companies:

A multinational company situated in U.S.A manufactures different types of machine parts. It's working method in the present globalization era would be like this. The scientific analysis, plans and designs of the various machinery and tools, to be produced by such multinational company are kept in the laboratory of the company, situated at it's Head Office in U.S.A. Then the company produces those machineries in China and sends them by ship to Mexico and East European Countries, where they are assembled to make finished products and those are sent for sale to different countries of the world. It is to be noted that, the customer care services of the company are executed at different Call Centres in India. It is understood from the above examples that, the multinational company not only makes it's products available for sale, throughout the world, but also takes the help of different countries of the world for their production. The reason for this is that the Multinational Companies plan to earn more and more profit by producing their goods at the lowest cost. Since the Chinese labourers work at a comparatively lower wages, many companies produce their goods in China and send these good for sale to Mexico and East European Countries, because these countries are nearer to the markets of many prosperous countries of the world like US or Europe. There are many experts in the field of information technology and skilled engineers in India, those due to their intelligence and fluency in English language advice the customers and help them through the Call Centres. For this the MNCs are able to reduce their cost of production by about 50% to 60% and their amount of profit increases manifold. You will be surprised to know that, there are such MNCs, whose total assets are more than the budgets of some developing countries. From this, you can imagine the power strength and influence of the MNCs.

THE INFLUENCE OF NEW ECONOMIC POLICY IN INDIA AND WTO:

After 1991, the new economic policy has been adopted by India and various changes have occurred due to it. Now a days, more and more consumer goods produced by famous MNCs are being available in our country. The country has made strides in the field of telecommunication. Everybody is aware of the utility of the mobile phones. The foreign exchange reserve of the country has increased to US $28,877 crores in the year 2012. The rate of inflation has become stable; but the new economic policy has not been of much help in the employment sector. So, there has been an increase in the number of unemployed people. In a nutshell, there has been a marked improvement in the standard of living of the people.

The WTO (World Trade Organisation) was created in 1995 by the member countries of the United Nations having it's Head Office at Geneva. The main purpose of this organization is to increase trade among different countries of the world, through exchange of goods and services among them and to enrich and strengthen the world economy and after all, to bring stability in the economies of the developing countries. Chiefly, this organization lays emphasis on the three areas in relation to World Trade. These are as follows :

1. To introduce free, uninterrupted and fair trade among different countries of the world.
2. Introduction of multilateral trade agreement among countries instead of bi-lateral trade agreement.
3. Abolition of previous rules and restrictions regarding export and import prevalent among different countries.

In the year 2001, India became a member of the WTO and has agreed to abide by the rules and conditions. After that, india has changed its trade policy and has announced a new export import policy in 2001-2002 in accordance with the condition of the W.T.O. India has lifted the restrictions on 215 goods and has taken various steps for the export of agricultural produce and components. Government has permitted, to import essential commodities like Petrol, Diesel, natural gas etc, through private organizations. In spite of this, India has not been benefitted much from the activities of the WTO or the globalization policy. The main reason for this that the developed countries are having a greater role in the working of the WTO and they are able to influence it's rules and regulations. The share of India in the global trade is less than one percent, moreover our domestic industries are not able to compete with MNCs, because their amount of production, working skills and quality of products are comparatively less than those of the MNCs. Different products of various countries of the world are available plentily in our country after adoption of globalisation and after India became a member of the W.T.O. By this our domestic knowhow and industries are incurring losses, even our agricultural products are not being sold properly.

EXAMPLE : a person named Rabi has opened a small enterprise in Delhi by availing loan from a Bank. He manufactures capacitors used in televisions, fans and tube lights etc. he had earning a profit of nearly one lakh rupees per month, after meeting all expenses including the salaries of nearly twenty employees. But this enterprise faced server hardship in it's capacitor business since 2011 (when India became a member of the W.T.O). Because, as per the new law, many MNCs are selling capacitors to television companies at a much lower rate than Rabi's firm, resulting in a slowdown in Rabi's business. Probably Rabi may be compelled to close his firm within a short time.

The manufacturers of battery, capacitor, plastic goods, toys, tyres, milk products and vegetables oil have been adversely affected by globalisation and this has resulted in a critical situation in India. because, a large number of

workers are employed in these small scale industries (around 2 crores). These labourers will become unemployed if these small enterprises become insolvent and face closure.

Under these circumstances, the duty of our domestic companies is to enhance the quality and skill of their goods and services and to reduce their cost of production. So that, we can compete with the MNCs. Only then, the demand of Indian goods and services will increase in the global market and thereby India will be immensely benefitted.

There is a demand for Indian textiles in USA. The jeans, shirts and pants produced by Indian Companies are the first choice of the Americans and those are sold at a high price there.

EXERCISE

1.ANSWER THE FOLLOWING QUESTIONS

i. What do you mean by Economic Development?
ii. How is the per capita income measured?
iii. Where is India and The United States of America positioned, as per the Economic Development statistics?
iv. Name the Economic Policy adopted by India.
v. What do you mean by Globalisation?
vi. In India, Agriculture belongs to which Economic Policy?
vii. Where does the Liberlisation Policy start in India?
viii. When and where does the World Trade Organisation start?
ix. What was Money Value position in India in the year 1991?

2. WRITE SHORT NOTE ON THE FOLLOWING TERMS

i. Economic Development
ii. Liberalisation
iii. Developing Countries
iv. Globalisation
v. Developed Countries
vi. Privatisation
vii. Mixed Economy
viii. World Trade Organisation
ix. Export and Import Policy of 2001-02

3. DIFFERNTIATE BETWEEN THE FOLLOWING

i. National Income and Per Capita Income
ii. Developing Countries and Developed Countries
iii. Nationalisation and Privatisation