

IMPORTANT CHAPTERS FROM SOCIAL SCIENCE AND SCIENCE (FROM NCERT CLASS 10TH)

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NCERT CLASS-X-SOCIAL SCIENCE, CONTEMPORARY INDIA-CHAPTERS-2, 3, 4 & 5

NCERT CLASS-X-SCIENCE-CHAPTERS-14TH, 15TH & 16th

CHAPTER-2-FOREST AND WILDLIFE RESOURCES

- Lepcha folk song from northern part of West Bengal
- ‘critical’, that is on the verge of extinction like the cheetah, pink-headed duck, mountain quail, forest spotted owl, and plants like madhuca insignis (a wild variety of mahua) and hubbardia heptaneuron, (a species of grass).
- Based on the International Union for Conservation of Nature and Natural Resources (IUCN), we can classify as follows –

Normal Species:

- Species whose population levels are considered to be normal for their survival, such as cattle, sal, pine, rodents, etc.

Endangered Species:

- species which are in danger of extinction.
- The survival of such species is difficult if the negative factors that have led to a decline in their population continue to operate.
- The examples of such species are black buck, crocodile, Indian wild ass, Indian rhino, lion tailed macaque, sangai (brow antler deer in Manipur), etc.

Vulnerable Species:

- species whose population has declined to levels from where it is likely to move into the endangered category in the near future if the negative factors continue to operate.
- The examples of such species are blue sheep, Asiatic elephant, Gangetic dolphin, etc.

Rare Species:

- Species with small population may move into the endangered or vulnerable category if the negative factors affecting them continue to operate.
- The examples of such species are the Himalayan brown bear, wild Asiatic buffalo, desert fox and hornbill, etc.

Endemic Species:

- species which are only found in some particular areas usually isolated by natural or geographical barriers.
- Examples of such species are the Andaman teal, Nicobar pigeon, Andaman wild pig, mithun in Arunchal Pradesh.

Extinct Species:

- species which are not found after searches of known or likely areas where they may occur.
- A species may be extinct from a local area, region, country, continent or the entire earth.
- Examples of such species are the Asiatic cheetah, pink head duck.
- Narmada Sagar Project in Madhya Pradesh.
- The Buxa Tiger Reserve in West Bengal is seriously threatened by the ongoing dolomite mining.

The Himalayan Yew (Taxus wallachiana)

- a medicinal plant found in various parts of Himachal Pradesh and Arunachal Pradesh.
- A chemical compound called ‘_taxol’ is extracted from the bark, needles, twigs and roots of this tree, and it has been successfully used to treat some cancers – the drug is now the biggest selling anti-cancer drug in the world.
- The species is under great threat due to over-exploitation.
- In the last one decade, thousands of yew trees have dried up in various parts of Himachal Pradesh and Arunachal Pradesh.
- The Indian Wildlife (Protection) Act was implemented in 1972, with various provisions for protecting habitats.
- The central government also announced several projects for protecting specific animals, which were gravely threatened, including the tiger, the one horned rhinoceros, the Kashmir stag or hangul, three types of crocodiles – fresh water crocodile, saltwater crocodile and the Gharial, the Asiatic lion, and others.
- Most recently, the Indian elephant, black buck (chinkara), the great Indian bustard (godawan) and the snow leopard, etc. have been given full or partial legal protection against hunting and trade throughout India.
- —Project Tiger I, one of the well-publicized wildlife campaigns in the world, was launched in 1973.
- Tiger conservation has been viewed not only as an effort to save an endangered species, but with equal importance as a means of preserving biotypes of sizeable magnitude.
- Corbett National Park in Uttarakhand, Sunderbans National Park in West Bengal, Bandhavgarh National Park in Madhya Pradesh, Sariska Wildlife Sanctuary in Rajasthan, Manas Tiger Reserve in Assam and Periyar Tiger Reserve in Kerala are some of the tiger reserves of India.
- In the notification under Wildlife Act of 1980 and 1986, several hundred butterflies, moths, beetles, and one dragonfly have been added to the list of protected species.
- In 1991, for the first time plants were also added to the list, starting with six species.

Types and Distribution of Forest and Wildlife Resources

(i) **Reserved Forests:**

- More than half of the total forest land has been declared reserved forests.
- regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned.

(ii) **Protected Forests:**

- Almost one-third of the total forest area is protected forest, as declared by the Forest Department.
- This forest land are protected from any further depletion.

(iii) **Unclassed Forests:**

- These are other forests and wastelands belonging to both government and private individuals and communities.
- Reserved and protected forests are also referred to as permanent forest estates maintained for the purpose of producing timber and other forest produce, and for protective reasons.
- Madhya Pradesh has the largest area under permanent forests, constituting 75 per cent of its total forest area.
- Jammu and Kashmir, Andhra Pradesh, Uttarakhand, Kerala, Tamil Nadu, West Bengal, and Maharashtra have large percentages of reserved forests of its total forest area whereas Bihar, Haryana, Punjab, Himachal Pradesh, Odisha and Rajasthan have a bulk of it under protected forests.

- All Northeastern states and parts of Gujarat have a very high percentage of their forests as unclassed forests managed by local communities.
- Sariska Tiger Reserve, Rajasthan, In India joint forest management (JFM) programme furnishes a good example for involving local communities in the management and restoration of degraded forests.
- The programme has been in formal existence since 1988 when the state of Odisha passed the first resolution for joint forest management.
- JFM depends on the formation of local (village) institutions that undertake protection activities mostly on degraded forest land managed by the forest department.
- In return, the members of these communities are entitled to intermediary benefits like non-timber forest produces and share in the timber harvested by ‘successful protection’.

CHAPTER-3-WATER RESOURCES

- Hydraulic Structures in Ancient India
- In the first century B.C., Sringerapur 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, (Odisha), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), Kolhapur (Maharashtra), etc.
- In the 11 th Century , Bhopal Lake, one of the largest artificial lakes of its time was built.
- In the 14 th Century , the tank in Hauz Khas, Delhi was constructed by Iltutmish for supplying water to Siri Fort area.
- 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.
- 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.
- originally focused on the environmental issues related to trees that would be submerged under the dam water .
- Sedimentation also meant that the flood plains were deprived of silt, a natural fertiliser , further adding on to the problem of land degradation.
- the multi-purpose projects induced earthquakes, caused water borne diseases and pests and pollution resulting from excessive use of water.
- 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 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.
- Roof top rain water harvesting is the most common practice in Shillong, Meghalaya.
- 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.
- Tamil Nadu is the first 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.

BAMBOO DRIP IRRIGATION SYSTEM

- In Meghalaya, a 200-year -old system of tapping stream and spring water 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 at the site of the plant.

CHAPTER-4-AGRICULTURE

- a primary activity, which produces most of the food that we consume.
- Besides food grains, it also produces raw material for various industries.

TYPES OF FARMING

Primitive Subsistence Farming

- still practised in few pockets of India.
- practised on small patches of land with the help of primitive tools like hoe, dao and digging sticks, and family/community labour.
- depends upon monsoon, natural fertility of the soil and suitability of other environmental conditions to the crops grown.
- a slash and burn agriculture.
- Farmers clear a patch of land and produce cereals and other food crops to sustain their family.
- When the soil fertility decreases, the farmers shift and clear a fresh patch of land for cultivation.
- shifting allows Nature to replenish the fertility of the soil through natural processes; land productivity in this type of agriculture is low as the farmer does not use fertilisers or other modern inputs.
- known by different names in different parts of the country.
- It is jhumming in north-eastern states like Assam, Meghalaya, Mizoram and Nagaland; Pamlou in Manipur, Dipa in Bastar district of Chhattishgarh, and in Andaman and Nicobar Islands.
- Jhumming: The slash and burn agriculture is known as Milpa in Mexico and Central America, Conuco in Venezuela, Roca in Brazil, Masole in Central Africa, Ladang in Indonesia, Ray in Vietnam.
- In India, this primitive form of cultivation is called Bewar or Dahiya in Madhya Pradesh, Podu or Penda in Andhra Pradesh, P ama Dabi or Koman or Bringa in Odisha, Kumari in Western Ghats, Valre or Waltre in South-eastern Rajasthan, Khil in the Himalayan belt, Kuruwa in Jharkhand, and Jhumming in the North-eastern region.

Intensive Subsistence Farming

- practised in areas of high population pressure on land.
- It is labour intensive farming, where high doses of biochemical inputs and irrigation are used for obtaining higher production.
- the 'right of inheritance' leading to the division of land among successive generations has rendered land-holding size uneconomical, the farmers continue to take maximum output from the limited land in the absence of alternative source of livelihood.
- enormous pressure on agricultural land.

Commercial Farming

- use of higher doses of modern inputs, e.g. high yielding variety (HYV) seeds, chemical fertilisers, insecticides and pesticides in order to obtain higher productivity.
- The degree of commercialisation of agriculture varies from one region to another .
- For example, rice is a commercial crop in Haryana and Punjab, but in Odisha, it is a subsistence crop.
- Plantation is also a type of commercial farming.
- a single crop is grown on a large area.
- The plantation has an interface of agriculture and industry.
- Plantations cover large tracts of land, using capital intensive inputs, with the help of migrant labourers.
- All the produce is used as raw material in respective industries.
- In India, tea, coffee, rubber , sugar cane, banana, etc.. are important plantation crops.
- Tea in Assam and North Bengal coffee in Karnataka are some of the important plantation crops grown in these states.
- Since the production is mainly for market, a well-developed network of transport and communication connecting the plantation areas, processing industries and markets plays an important role in the development of plantations.

CROPPING PATTERN

- India has three cropping seasons — rabi, kharif and zaid. Rabi crops are sown in winter from October to December and harvested in summer from April to June.
- Some of the important rabi crops are wheat, barley, peas, gram and mustard.
- Though, these crops are grown in large parts of India, states from the north and northwestern parts such as Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Uttar Pradesh are important for the production of wheat and other rabi crops.
- Availability of precipitation during winter months due to the western temperate cyclones helps in the success of these crops.
- However, the success of the green revolution in Punjab, Haryana, western Uttar Pradesh and parts of Rajasthan has also been an important factor in the growth of the above mentioned rabi crops.
- Kharif crops** are grown with the onset of monsoon in different parts of the country and these are harvested in September -October.

- Important crops grown during this season are paddy, maize, jowar , bajra, tur (arhar), moong, urad, cotton, jute, groundnut and soyabean.
- Some of the most important rice-growing regions are Assam, West Bengal, coastal regions of Odisha, Andhra Pradesh, Telangana, Tamil Nadu, Kerala and Maharashtra, particularly the (Konkan coast) along with Uttar Pradesh and Bihar .
- paddy has also become an important crop of Punjab and Haryana.
- In states like Assam, West Bengal and Odisha, three crops of paddy are grown in a year .
- These are Aus, Aman and Boro.
- In between the rabi and the kharif seasons, there is a short season during the summer months known as the Zaidseason.
- crops produced during ‘zaid’ are water melon, muskmelon, cucumber, vegetables and fodder crops.
- Sugarcane takes almost a year to grow.

Major Crops

- A variety of food and nonfood crops are grown in different parts of the country depending upon the variations in soil, climate and cultivation practices.
- Major crops grown in India are rice, wheat, millets, pulses, tea, coffee, sugarcane, oil seeds, cotton and jute, etc.

Rice:

- staple food crop of a majority of the people in India.
- Our country is the second largest producer of rice in the world after China.
- a kharif crop which requires high temperature, (above 25°C) and high humidity with annual rainfall above 100 cm.
- In the areas of less rainfall, it grows with the help of irrigation.
- grown in the plains of north and north-eastern India, coastal areas and the deltaic regions.
- Development of dense network of canal irrigation and tubewells have made it possible to grow rice in areas of less rainfall such as Punjab, Haryana and western Uttar Pradesh and parts of Rajasthan.

Wheat:

- the second most important cereal crop. It is the main food crop, in north and north-western part of the country.
- rabi crop requires a cool growing season and a bright sunshine at the time of ripening.
- requires 50 to 75 cm of annual rainfall evenly distributed over the growing season.
- There are two important wheat-growing zones in the country – the Ganga-Satluj plains in the northwest and black soil region of the Deccan.
- The major wheat-producing states are Punjab, Haryana, Uttar Pradesh, Bihar , Rajasthan and parts of Madhya Pradesh.

Millets:

- Jowar , bajra and ragi are the important millets grown in India.
- known as coarse grains, they have very high nutritional value.

- For example, ragi is very rich in iron, calcium, other micro nutrients and roughage.
- Jowar is the third most important food crop with respect to area and production.
- It is a rain-fed crop mostly grown in the moist areas which hardly needs irrigation.
- Major Jowar producing States were Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh.
- Bajra grows well on sandy soils and shallow black soil.
- Major Bajra producing States were: Rajasthan, Uttar Pradesh, Maharashtra, Gujarat and Haryana.
- Ragi is a maize is grown in rabi season also.
- Use of modern inputs such as HYV seeds, fertilisers and irrigation have contributed to the increasing production of maize.
- Major maize-producing states are Karnataka, Uttar Pradesh, Bihar, Andhra Pradesh, Telangana and Madhya Pradesh.

Pulses:

- India is the largest producer as well as the consumer of pulses in the world.
- These are the major source of protein in a vegetarian diet.
- Major pulses that are grown in India are tur (arhar), urad, moong, masur, peas and Therefore, these are mostly grown in rotation with other crops.
- Major pulse producing states in India are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Karnataka.

Food Crops other than Grains

Sugarcane:

- a tropical as well as a subtropical crop.
- grows well in hot and humid climate with a temperature of 21°C to 27°C and an annual rainfall between 75cm. and 100cm.
- Irrigation is required in the regions of low rainfall.
- grown on a variety of soils and needs manual labour from sowing to harvesting.
- India is the second largest producer of sugarcane only after Brazil.
- main source of sugar , gur (jaggary), khandsari and molasses.
- The major sugarcane-producing states are Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Bihar , Punjaband Haryana.

Oil Seeds:

- India was the second largest producer of groundnut in the world after china.
- Main oil-seeds produced in India are groundnut, mustard, coconut, sesamum (til), soyabean, castor seeds, cotton seeds, linseed and sunflower.
- these are edible and used as cooking mediums.
- However , some of these are also used as raw material in the production of soap, cosmetics and ointments.
- Groundnut is a kharif crop and accounts for about half of the major oilseeds produced in the country.

- Gujarat was the largest producer of groundnut followed by Andhra Pradesh and Tamil Nadu in 2011-12.
- Linseed and mustard are rabi crops.
- Sesamum is a kharif crop in north and rabi crop in south India.
- Castor seed is grown both as rabi and kharif crop.

Tea:

- an example of plantation agriculture.
- also an important beverage crop introduced in India initially by the British.
- most of the tea plantations are owned by Indians.
- grows well in tropical and sub-tropical climates endowed with deep and fertile well-drained soil, rich in humus and organic matter.
- require warm and moist frost-free climate all through the year.
- Frequent showers evenly distributed over the year ensure continuous growth of tender leaves.
- a labour intensive industry.
- requires abundant, cheap and skilled labour .
- processed within the tea garden to restore its freshness.
- Major teaproducing states are Assam, hills of Darjeeling and Jalpaiguri districts, West Bengal, Tamil Nadu and Kerala.
- Apart from these, Himachal Pradesh, Uttarakhand, Meghalaya, Andhra Pradesh and Tripura are also tea-producing states in the country.

Coffee:

- Indian coffee is known in the world for its good quality.
- The Arabica variety initially brought from Yemen is produced in the country.
- Initially its cultivation was introduced on the Baba Budan Hills and even today its cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu

Horticulture Crops:

- India is a producer of tropical as well as temperate fruits.
- Mangoes of Maharashtra, Andhra Pradesh, Telangana, Uttar Pradesh and West Bengal, oranges of Nagpur and Cherrapunjee (Meghalaya), bananas of Kerala, Mizoram, Maharashtra and Tamil Nadu, lichi and guava of Uttar Pradesh and Bihar , pineapples of Meghalaya, grapes of Andhra Pradesh, Telangana and Maharashtra, apples, pears, apricots and walnuts of Jammu and Kashmir and Himachal Pradesh are in great demand the world over.
- India produces about 13 per cent of the world's vegetables.
- an important producer of pea, cauliflower, onion, cabbage, tomato, brinjal and potato.

Non-Food Crops Rubber:

- an equatorial crop, but under special conditions, it is also grown in tropical and sub-tropical areas.
- requires moist and humid climate with rainfall of more than 200 cm. and temperature above 25°C.
- Rubber is an important industrial raw material.

- mainly grown in Kerala, Tamil Nadu, Karnataka and Andaman and Nicobar islands and Garo hills of Meghalaya.

Fibre Crops:

- Cotton, jute, hemp and natural silk are the four major fibre crops grown in India.
- The first three are derived from the crops grown in the soil, the latter is obtained from cocoons of the silkworms fed on green leaves specially mulberry.
- Rearing of silk worms for the production of silk fibre is known as sericulture.

Cotton:

- India is believed to be the original home of the cotton plant.
- Cotton is one of the main raw materials for cotton textile industry.
- grows well in drier parts of the black cotton soil of the Deccan plateau.
- requires high temperature, light rainfall or irrigation, 210 frost-free days and bright sun-shine for its growth.
- kharif crop and requires 6 to 8 months to mature.
- Major cotton-producing states are– Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Punjab, Haryana and Uttar Pradesh.

Jute:

- known as the golden fibre.
- Jute grows well on well-drained fertile soils in the flood plains where soils are renewed every year.
- High temperature is required during the time of growth.
- West Bengal, Bihar, Assam, Odisha and Meghalaya are the major jute producing states.
- used in making gunny bags, mats, ropes, yarn, carpets and other artifacts.
- Due to its high cost, it is losing market to synthetic fibres and packing materials, particularly the nylon.
- The Green Revolution based on the use of package technology and the White Revolution (Operation Flood) were some of the strategies initiated to improve the lot of Indian agriculture.
- Provision for crop insurance against drought, flood, cyclone, fire and disease, establishment of Grameen banks, cooperative societies and banks for providing loan facilities to the farmers at lower rates of interest were some important steps in this direction.
- Kissan Credit Card (KCC), Personal Accident Insurance Scheme (PAIS) are some other schemes introduced by the Government of India for the benefit of the farmers.
- special weather bulletins and agricultural programmes for farmers were introduced on the radio and television.
- The government also announces minimum support price, remunerative and procurement prices for important crops to check the exploitation of farmers by speculators and middlemen.

Bhoodan –

- Vinoba Bhave
- Once, when he was delivering a lecture at Pochampalli in Andhra Pradesh, some poor landless villagers demanded some land for their economic well-being.

- Vinoba Bhave could not promise it to them immediately but assured them to talk to the Government of India regarding provision of land for them if they undertook cooperative farming.
- Suddenly , Shri Ram Chandra Reddy stood up and offered 80 acres of land to be distributed among 80 land-less villagers. This act was known as ‘Bhoodan ‘.
- Later he travelled and introduced his ideas widely all over India. Some zamindars, owners of many villages offered to distribute some villages among the landless. It was known as Gramdan.
- Bhoodan- Gramdan movement initiated by Vinoba Bhave is also known as the Blood-less Revolution.
- In order to ensure availability of food to all sections of society our government carefully designed a national food security system.
- It consists of two components (a) buffer stock and (b) public distribution system (PDS).
- PDS is a programme which provides food grains and other essential commodities at subsidised prices in rural and urban areas.
- India’s food security policy has a primary objective to ensure availability of foodgrains to the common people at an affordable price.
- enabled the poor to have access to food.
- The focus of the policy is on growth in agriculture production and on fixing the support price for procurement of wheat and rice, to maintain their stocks.
- Food Corporation of India (FCI) is responsible for procuring and stocking foodgrains, whereas distribution is ensured by public distribution system (PDS).
- The FCI procures foodgrains from the farmers at the government announced minimum support price (MSP).
- The government used to provide subsidies on agriculture inputs such as fertilizers, power and water .
- These subsidies have now reached unsustainable levels and have also led to large scale inefficiencies in the use of these scarce inputs.
- Excessive and imprudent use of fertilizers and water has led to waterlogging, salinity and depletion of essential micronutrients in the soil.
- The high MSP, subsidies in input and committed FCI purchases have distorted the cropping pattern.
- Wheat and paddy crops are being grown more for the MSP they get. Punjab and Haryana are foremost examples.
- the consumers are divided into two categories : below poverty line (BPL) and above poverty line (APL), with the issue price being different for each category.
- APL slip back to BPL, because of the failure of even one crop and it is administratively difficult to accommodate such shifts.
- Each district and block can be made self sufficient in foodgrain production if government provides proper agricultural infrastructure, credit linkages and also encourages the use of latest techniques.
- Instead of concentrating only on rice or wheat, the food crop with a better growth potential in that particular area must be encouraged.

- Creation of necessary infrastructure like irrigation facilities, availability of electricity etc. may also attract private investments in agriculture.
- The focus on increasing foodgrain production which should be on a sustainable basis and also free trade in grains will create massive employment and reduce poverty in rural areas.
- There has been a gradual shift from cultivation of food crops to cultivation of fruits, vegetables, oil-seeds and industrial crops.
- The competition for land between non-agricultural uses such as housing etc. and agriculture has resulted in reduction in the net sown area.
- Periodic scarcity of water has led to reduction in area under irrigation.
- Inefficient water management has led to water logging and salinity.
- Indian agriculture finds itself at the crossroads.
- To make agriculture successful and profitable, proper thrust should be given to the improvement of the condition of marginal and small farmers.
- The green revolution promised much.
- But today it's under controversies. It is being alleged that it has caused land degradation due to overuse of chemicals, drying aquifers and vanishing biodiversity. The keyword today is —gene revolutionl.
- includes genetic engineering.
- Genetic engineering is recognised as a powerful supplement in inventing new hybrid varieties of seeds.
- Infact organic farming is much in vogue today because it is practised without factory made chemicals such as fertilisers and pesticides.
- does not affect environment in a negative manner .
- Indian farmers should diversify their cropping pattern from cereals to high-value crops.
- This will increase incomes and reduce environmental degradation simultaneously.
- fruits, medicinal herbs, flowers, vegetables, bio-diesel crops like jatropha and jojoba need much less irrigation than rice or sugarcane.
- India's diverse climate can be harnessed to grow a wide range of high-value crops.

CHAPTER-5-MINERALS AND ENERGY RESOURCES

What is a mineral?

- a -homogenous, naturally occurring substance with a definable internal structure.l
- found in varied forms in nature, ranging from the hardest diamond to the softest talc.
- Rocks are combinations of homogenous substances called minerals.

MODE OF OCCURRENCE OF MINERALS

- Minerals are usually found in —oresl.
- ore is used to describe an accumulation of any mineral mixed with other elements.
- The mineral content of the ore must be in sufficient Minerals generally occur in these forms:

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.

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.
- 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.
- 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.
- 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.

Rat-Hole Mining.

- 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. 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.

Ferrous Minerals

Iron Ore

- 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).
- The major iron ore belts in India are:

Odisha-Jharkhand belt:

- In Odisha high grade hematite ore is found in Badampahar mines in the Mayurbhanj and Kendujhar districts.
- In the adjoining Singhbhum 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 Chhattisgarh. The range of hills comprise of 14 deposits of super high grade hematite iron ore.
- best physical properties needed for steel making.
- Iron ore from these mines is exported to Japan and South Korea via Vishakhapatnam port.

Ballari-Chitradurga- ChikkamagaluruTumakuru

- Karnataka has large reserves of iron ore.
- The Kudremukh mines located in the Western Ghats of Karnataka are a 100 per cent 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 Mangaluru.
- 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

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

Non-Ferrous Minerals:

- India's reserves and production of non-ferrous minerals is not very satisfactory.
- 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.

Copper

- 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
- The Balaghat mines in Madhya Pradesh, Khetri mines in Rajasthan and Singhbhum district of Jharkhand are leading producers of copper.

Bauxite

- a clay-like substance that alumina and later aluminium is obtained.
- 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 the Amarkantak plateau, Maikal hills and the plateau region of Bilaspur-Katni.
- Odisha was the largest bauxite producing state in India
- Panchpatmali deposits in Koraput district are the most important bauxite deposits in the state.

Non-Metallic Minerals

- Mica is a mineral made up of a series of plates or leaves.
- 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 dielectric 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.

Rock Minerals:

- Limestone is found in association with rocks composed of calcium carbonates or calcium and magnesium carbonates.
- 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.

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 conventional and 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.
- 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.
- provides a substantial part of the nation's energy needs.
- 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.
- coal is formed due the compression of plant material over millions of years.
- 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 and high moisture contents and low heating capacity.
- Lignite is a low grade brown coal, which is soft with high moisture content.
- 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.
- 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.
- 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 stations are located on or near the coalfields.

Petroleum

- Petroleum or mineral oil is the next major energy source in India after coal.
- 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.
- From the map locate the 3 major off shore fields of western India.
- Ankeleshwar is the most important field of Gujarat.
- Assam is the oldest oil producing state of India.
- Digboi, Naharkatiya and Moran-Hugrijan are the important oil fields in the state.

Natural Gas

- an important clean energy resource found in association with or without petroleum.
- used as a source of energy as well as an industrial raw material in the petrochemical industry.
- 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.

Non-Conventional Sources of Energy

Nuclear or Atomic Energy

- 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.

Solar Energy

- India is a tropical country.
- 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.

- Some big solar power plants are being established in different parts of India which will 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 has great potential of wind power.
- The largest wind farm cluster is located in Tamil Nadu from Nagarcoil 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 known 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 Khambhat, the Gulf of Kutch in Gujarat on the western coast and Gangetic delta in Sunderban regions of West Bengal provide ideal conditions for utilizing tidal energy.
- Geo Thermal Energy Geo thermal 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.

SCIENCE-CLASS-X-

CHAPTER-14TH-SOURCES OF ENERGY

- The fossil fuels are non-renewable sources of energy, so we need to conserve them.
- The oxides of carbon, nitrogen and sulphur that are released on burning fossil fuels are acidic oxides.
- These lead to acid rain which affects our water and soil resources.

- The pollution caused by burning fossil fuels can be somewhat reduced by increasing the efficiency of the combustion process and using various techniques to reduce the escape of harmful gases and ashes into the surroundings.
- Besides being used directly for various purposes – in gas stoves and vehicles.

Thermal Power Plant

- The transmission of electricity is more efficient than transporting coal or petroleum over the same distance.
- Therefore, many thermal power plants are set up near coal or oil fields.

Hydro Power Plants

- The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is also a green-house gas.
- It creates the problem of satisfactory rehabilitation of is placed people.
- Opposition to the construction of Tehri Dam on the river Ganga and Sardar Sarovar project on the river Narmada are due to such problems.

Bio-Mass

- The source of fuels obtained from plant and animal products is said to be bio-mass.
- These fuels, however, do not produce much heat on burning and a lot of smoke is given out when they are burnt.
- Therefore, technological inputs to improve the efficiency of these fuels are necessary.
- When wood is burnt in a limited supply of oxygen, water and volatile materials present in it get removed and charcoal is left behind as the residue.
- Charcoal burns without flames, is comparatively smokeless and has a higher heat generation efficiency.
- Anaerobic micro-organisms that do not require oxygen decompose or break down complex compounds of the cow-dung slurry.
- It takes a few days for the decomposition process to be complete and generate gases like methane, carbon dioxide, hydrogen and hydrogen sulphide.
- Bio-gas is an excellent fuel as it contains up to 75% methane.
- It burns without smoke, leaves no residue like ash in wood, charcoal and coal burning.
- Its heating capacity is high. Bio-gas is also used for lighting.

Wind Energy

- Denmark is called the country of ‘winds’.
- More than 25% of their electricity needs are generated through a vast network of windmills.
- In terms of total output, Germany is the leader, while India is ranked fifth in harnessing wind energy for the production of electricity.
- It is estimated that nearly 45,000 MW of electrical power can be generated if India’s wind potential is fully exploited.
- The largest wind energy farm has been established near Kanyakumari in Tamil Nadu and it generates 380 MW of electricity.

- Wind energy is an environment-friendly and efficient source of renewable energy.
- It requires no recurring expenses for the production of electricity.
- But there are many limitations in harnessing wind energy.
- Firstly, wind energy farms can be established only at those places where wind blows for the greater part of a year.
- The wind speed should also be higher than 15 km/h to maintain the required speed of the turbine.
- Furthermore, there should be some back-up facilities (like storage cells) to take care of the energy needs during a period when there is no wind.
- Establishment of wind energy farms requires large area of land.
- For a 1 MW generator, the farm needs about 2 hectares of land. The initial cost of establishment of the farm is quite high.
- Moreover, since the tower and blades are exposed to the vagaries of nature like rain, Sun, storm and cyclone, they need a high level of maintenance.

ALTERNATIVE OR NON-CONVENTIONAL SOURCES OF ENERGY

Solar Energy

- A black surface absorbs more heat as compared to a white or a reflecting surface under identical conditions.
- A typical cell develops a voltage of 0.5–1 V and can produce about 0.7 W of electricity when exposed to the Sun.
- A large number of solar cells are, combined in an arrangement called solar cell panel (Fig. 14.7) that can deliver enough electricity for practical use.
- The principal advantages associated with solar cells are that they have no moving parts, require little maintenance and work quite satisfactorily without the use of any focussing device.
- Another advantage is that they can be set up in remote and inaccessible hamlets or very sparsely inhabited areas in which laying of a power transmission line may be expensive and not commercially viable.
- Silicon, which is used for making solar cells, is abundant in nature but availability of the special grade silicon for making solar cells is limited.
- The entire process of manufacture is still very expensive, silver used for interconnection of the cells in the panel further adds to the cost.
- In spite of the high cost and low efficiency, solar cells are used for many scientific and technological applications.
- Artificial satellites and space probes like Mars orbiters use solar cells as the main source of energy.
- Radio or wireless transmission systems or TV relay stations in remote locations use solar cell panels.
- Traffic signals, calculators and many toys are fitted with solar cells.
- The solar cell panels are mounted on specially designed inclined roof tops so that more solar energy is incident over it.
- The domestic use of solar cells is, however, limited due to its high cost.

Energy from the Sea

Tidal Energy

- Due to the gravitational pull of mainly the moon on the spinning earth, the level of water in the sea rises and falls.
- If you live near the sea or ever travel to some place near the sea, try and observe how the sea-level changes during the day.
- This phenomenon is called high and low tides and the difference in sea-levels gives us tidal energy.
- Tidal energy is harnessed by constructing a dam across a narrow opening to the sea.
- A turbine fixed at the opening of the dam converts tidal energy to electricity.
- As you can guess, the locations where such dams can be built are limited.

Wave Energy

- Similarly, the kinetic energy possessed by huge waves near the seashore can be trapped in a similar manner to generate electricity.
- The waves are generated by strong winds blowing across the sea.
- Wave energy would be a viable proposition only where waves are very strong.
- A wide variety of devices have been developed to trap wave energy for rotation of turbine and production of electricity.

Ocean Thermal Energy

- The water at the surface of the sea or ocean is heated by the Sun while the water in deeper sections is relatively cold.
- This difference in temperature is exploited to obtain energy in ocean-thermal-energy conversion plants.
- These plants can operate if the temperature difference between the water at the surface and water at depths up to 2 km is 293 K (20°C) or more.
- The warm surface-water is used to boil a volatile liquid like ammonia.
- The vapours of the liquid are then used to run the turbine of generator.
- The cold water from the depth of the ocean is pumped up and condense vapour again to liquid.

Geothermal Energy

- Due to geological changes, molten rocks formed in the deeper hot regions of earth's crust are pushed upward and trapped in certain regions called 'hot spots'.
- When underground water comes in contact with the hot spot, steam is generated.
- Sometimes hot water from that region finds outlets at the surface. Such outlets are known as hot springs.
- The steam trapped in rocks is routed through a pipe to a turbine and used to generate electricity.
- The cost of production would not be much, but there are very few commercially viable sites where such energy can be exploited.
- There are number of power plants based on geothermal energy operational in New Zealand and United States of America.

Nuclear Energy

- In a process called nuclear fission, the nucleus of a heavy atom (such as uranium, plutonium or thorium), when bombarded with low-energy neutrons, can be split apart into lighter nuclei.
- When this is done, a tremendous amount of energy is released if the mass of the original nucleus is just a little more than the sum of the masses of the individual products.
- The fission of an atom of uranium, for example, produces 10 million times the energy produced by the combustion of an atom of carbon from coal.
- In a nuclear reactor designed for electric power generation, such nuclear 'fuel' can be part of a self-sustaining fission chain reaction that releases energy at a controlled rate.
- The released energy can be used to produce steam and further generate electricity. Nuclear power reactors located at Tarapur (Maharashtra), Rana Pratap Sagar (Rajasthan), Kalpakkam (Tamil Nadu), Narora (UP), Kakrapar (Gujarat) and Kaiga (Karnataka) have the installed capacity of less than 3% of the total electricity generation capacity of our country.

Nuclear fusion

- Currently all commercial nuclear reactors are based on nuclear fission.
- another possibility of nuclear energy generation by a safer process called nuclear fusion.
- Fusion means joining lighter nuclei to make a heavier nucleus, most commonly hydrogen or hydrogen isotopes to create helium, It releases a tremendous amount of energy, according to the Einstein equation, as the mass of the product is little less than the sum of the masses of the original individual nuclei.
- the source of energy in the Sun and other stars.
- takes considerable energy to force the nuclei to fuse.
- The conditions needed for this process are extreme – millions of degrees of temperature and millions of pascals of pressure.
- The hydrogen bomb is based on thermonuclear fusion reaction.
- A nuclear bomb based on the fission of uranium or plutonium is placed at the core of the hydrogen bomb.
- This nuclear bomb is embedded in a substance which contains deuterium and lithium.
- The high temperature generates sufficient energy for the light nuclei to fuse and a devastating amount of energy is released.

SCIENCE CLASS-X-CHAPTER-15-OUR ENVIRONMENT

Eco-system — what are its components?

- All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem.
- an ecosystem consists of biotic components comprising living organisms and abiotic components comprising physical factors like temperature, rainfall, wind, soil and minerals.

Food Chains and Webs

- series of organisms taking part at various biotic levels form a food chain
- Each step or level of the food chain forms a trophic level.
- The autotrophs or the producers are at the first trophic level. They fix up the solar energy and make it available for heterotrophs or the consumers.
- The herbivores or the primary consumers come at the second, small carnivores or the secondary consumers at the third and larger carnivores or the tertiary consumers form the fourth trophic level

Ozone Layer and How it is Getting Depleted

- Ozone (O₃) is a molecule formed by three atoms of oxygen.
- While O₂, which we normally refer to as oxygen, is essential for all aerobic forms of life.
- Ozone, is a deadly poison.
- at the higher levels of the atmosphere, ozone performs an essential function.
- It shields the surface of the earth from ultraviolet (UV) radiation from the Sun.
- This radiation is highly damaging to organisms, for example, it is known to cause skin cancer in human beings.
- Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O₂) molecule.
- The higher energy UV radiations split apart some molecular oxygen (O₂) into free oxygen (O) atoms.
- These atoms then combine with the molecular oxygen to form ozone as shown—The amount of ozone in the atmosphere began to drop sharply in the 1980s.
- This decrease has been linked to synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers.
- In 1987, the United Nations Environment Programme (UNEP) succeeded in forging an agreement to freeze CFC production at 1986 levels.

Class-X-Chapter-16th-Management of Natural Resources

- Ganga Action Plan. This multi-crore project came about in 1985 because the quality of the water in the Ganga was very poor
- Coliform is a group of bacteria, found in human intestines, whose presence in water indicates contamination by disease-causing microorganisms
- three R's to save the environment: Reduce, Recycle and Reuse.

Forests And Wild Life

- Forests are 'biodiversity hot spots'

Sustainable Management

- The Chipko Andolan ('Hug the Trees Movement') was the result of a grassroot level effort to end the alienation of people from their forests. The movement originated from an incident in a remote village called Reni in Garhwal, high-up in the Himalayas during the early 1970s.
- Himachal Pradesh had evolved a local system of canal irrigation called kulhs

Water Harvesting

- Watershed management emphasises scientific soil and water conservation in order to increase the biomass production.
- The aim is to develop primary resources of land and water, to produce secondary resources of plants and animals for use in a manner which will not cause ecological imbalance.
- Watershed management not only increases the production and income of the watershed community, but also mitigates droughts and floods and increases the life of the downstream dam and reservoirs.
- Water harvesting is an age-old concept in India. Khadins, tanks and nadisin Rajasthan, bandharasand talsin Maharashtra, bundhis in Madhya Pradesh and Uttar Pradesh, aharsand pynesin Bihar, kulhsin Himachal Pradesh, ponds in the Kandi belt of Jammu region, and eris(tanks) in Tamil Nadu, surangamsin Kerala, and kattasin Karnataka are some of the ancient water harvesting, including water conveyance, structures still in use today

Coal And Petroleum

- Coal and petroleum were formed from the degradation of bio-mass millions of years ago and hence these are resources that will be exhausted in the future contain hydrogen, nitrogen and sulphur.
- When combustion takes place in insufficient air (oxygen), then carbon monoxide is formed instead of carbon dioxide.

Of these products, the oxides of sulphur and nitrogen and carbon monoxide are poisonous at high concentrations and carbon dioxide is a green-house gas they are huge reservoirs of carbon and if all of this carbon is converted to carbon dioxide, then the amount of carbon dioxide in the atmosphere is going to increase leading to intense global warming.

