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Paper VIII- (ENVIRONMENTAL STUDIES)
AS-2626

Note: Attempt only five questions. Question number 1 is compulsory.

Q1. A) Objective type of questions: (1x5)

1. Which of the following layer characterised by gradual decline in temperatures to about -90^{o}C
   a. Troposphere
   b. Mesosphere
   c. Stratosphere
   d. Thermosphere

Ans:- b. Mesosphere

2. The loss of top soil by various agents is called:-
   a. Soil erosion
   b. Soil conservation
   c. Soil loss
   d. Tillage

Ans:-a. Soil erosion

3. 5th June is celebrated as-
   a. World Environment Day
   b. World Forestry Day
   c. World food Day
   d. None of the above

Ans:- a. World Environment Day

4. The number of species that occur in an area is-
   a. Species diversity
   b. Species richness
   c. Community Diversity
   d. None of the above

Ans:- a. Species diversity

5. Stratosphere ozone is depleted by:-
   a. SO_2
   b. H_2O
   c. CFC's
   d. CO_2

Ans:- c. CFC's

Q1. B) State true or false (1x5)

1. Knowledge information and beauty are in tangible resource. **(False)**
2. Marasmus is caused due to deficiency of Iron **(False)**
3. Flow of energy in an ecosystem is always unidirectional. **(True)**
4. Salt is a non-metallic mineral. **(True)**
5. First order consumers are carnivores **(False)**

Q1. C) Define: (2x5)

1. **Environment:** is the sum total of abiotic and biotic conditions influencing the response of a particular organism.
2. **Atmosphere:** The gaseous envelop surrounding the earth is composed of an entire mass of air containing N_2, O_2, H_2O, CO_2 & inert gases is known as atmosphere
3. **Ore:** is a mineral or combination of minerals from which a useful substance such as a metal, can be extracted and used to manufacture a useful product.
4. **Mineral:** Naturally occurring substances of definite chemical composition and identifiable physical properties.
5. **Soil erosion:** Soil erosion is the washing or blowing away (by wind or water) of the top layer of soil (dirt)

Q2. Describe the hydrological cycle with a well labelled diagram. Explain the use and overexploitation of surface and ground water.

Ans:

The water cycle, through evaporation and precipitation, maintains hydrological systems which form rivers and lakes and support in a variety of aquatic ecosystems. Wetlands are intermediate forms between terrestrial and aquatic ecosystems and contain species of plants and animals that are highly moisture dependent. All aquatic ecosystems are used by a large number of people for their daily needs such as drinking water, washing, cooking, watering animals, and irrigating fields. The world depends on a limited quantity of fresh water. Water covers 70% of the earth's surface but only 3% of this is fresh water. Of this, 2% is in polar ice caps and only 1% is usable water in rivers, lakes and subsoil aquifers. Only a fraction of this can be actually used. At a global level 70% of water is used for agriculture about 25% for industry and only 5% for domestic use. However this varies in different countries and industrialized countries use a greater percentage for industry. India uses 90% for agriculture, 7% for industry and 3% for domestic use. The total annual freshwater withdrawals today are estimated at 3800 cubic kilometers, twice as much as just 50 years ago (World Commission on Dams, 2000). Studies indicate that a person needs a minimum of 20 to 40 liters of water per day for drinking and sanitation. More than one billion people worldwide have no access to clean water, and to many more, supplies are unreliable.India is expected to face critical levels of water stress by 2025. At the global level 31 countries are already short of water and by 2025 there will be 48 countries facing serious water shortages. The UN has estimated that by the year 2050, 4 billion people will be seriously affected by water shortages. This will lead to multiple conflicts between countries over the sharing of water. Around 20 major cities in India face chronic or interrupted water shortages. There are 100 countries that share the waters of 13 large rivers and lakes. The upstream countries could starve the downstream nations leading to political unstable areas across the world. Examples are Ethopia, which is upstream on the Nile and Egypt, which is downstream and highly dependent on the Nile.

Overutilization of surface and groundwater:

With the growth of human population there is an increasing need for larger amounts of water to fulfil a variety of basic needs. Today in many areas this requirement cannot be met. Overutilization of water occurs at various levels. Most people use more water than they really need. Most of us waste water during a bath by using a shower or during washing of clothes. Many agriculturists use more water than necessary to grow crops. There are many ways in which farmers can use less water without reducing yields such as the use of drip irrigation systems. Agriculture also pollutes surface water and underground water stores by the excessive use of chemical fertilizers and pesticides. Methods such as the use of biomass as fertilizer and non toxic pesticides such as neem products and using integrated pest management systems reduces the agricultural pollution of surface and ground water. Industry tends to maximise short-term economic gains by not bothering about its liquid waste and releasing it into streams, rivers and the sea. In the longer term, as people become more conscious of using 'green products' made by ecosensitive industries, the polluter's products may not be used. The polluting industry that does not care for the environment and pays off bribes to get away from the cost needed to use effluent treatment plants may eventually be caught, punished and even closed down. Public awareness may increasingly put pressures on industry to produce only eco friendly products which are already gaining in popularity. As people begin to learn about the serious health hazards caused by pesticides in their food, public awareness can begin putting pressures on farmers to reduce the use of chemicals that are injurious to health.

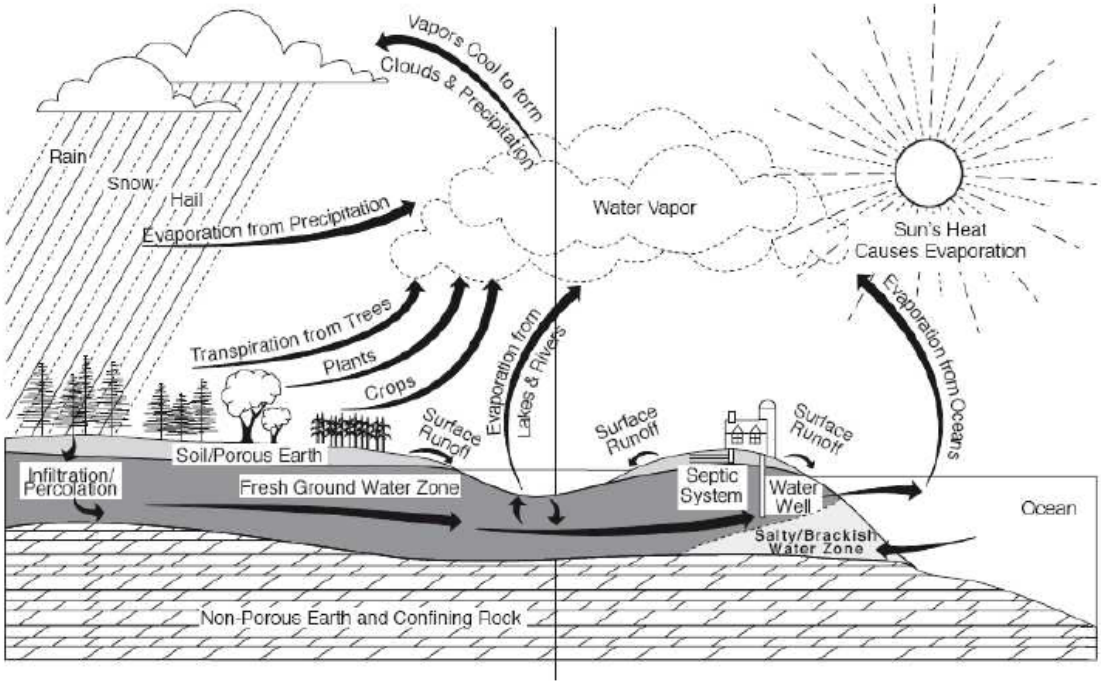

Fig 1.: Hydrological Cycle

Q3. Write short notes on the following:

1. Food Chain:

The transfer of food energy from the source in plants through a series of organism by repeated eating and being eaten up is called food chain. Food is the energy providing source of living being and supply energy for animal's activities.

Food chains are not isolated unit but are hooked together in food web. The number of steps of links in a food chain is restored usually to four or five. In natured communities organism whose food is obtained from plants by the same number of steps belong to the same trophic level. We can divide food chains in three types.

- **The predator chain:** It starts from plant base and goes from smaller to larger animals.
- **The parasite chain:-** It goes from larger to smaller animals.
- **The saprophytic chain:-** It goes from dead matter to micro organism.

Basically two types of food chain are recognised

I. **Grazing food chain:** It start from green plants and ends with carnivores passing through herbivores. Plant may be eaten up by herbivores, dies or decays. Secondary consumers or primary carnivore eat the herbivore. And tertiary consumers eat secondary consumers. The gross energy is derived from the tissue of herbivores.

Autotroph ⟶ Herbivores ⟶ Primary carnivores ⟶ Secondary carnivores

II. **Detritus food chain:-** the organic wastes derived from the grazing food chain are termed as detritus. The energy contained in the detritus is consumed by detrivores (algae, fungi, and insects) that form a food chain in the ecosystem. These detrivores ingest decomposed organic matter digest them partially and after extracting chemical energy for their metabolism. Thus they broken down complex organic molecules into simpler molecules:

Plant ⟶ Insect ⟶ Frog ⟶ Snake

2. Species diversity

The number of species of plants and animals that are present in a region constitutes its species diversity. This diversity is seen both in natural ecosystem and in agricultural ecosystem. Some areas are richer in species than others. For example, natural undisturbed tropical forests have much greater species richness than mono culture plantations developed by the forest department for timber products. A natural forest ecosystem provides large number of non-timber forest products that local people depend on such as fruits, fuel, wood, fodder, fiber, gum, resin and medicines. Timber plantations do not provide the large variety of goods that are essential for local consumption. Modern intensive agro ecosystem has a relatively lower density of crops than

traditional agropastoral farming systems, where multiple crops were planted. Areas that are rich in species diversity are called 'hotspots' of diversity and the countries with highest species richness or have a relatively large proportion of these hot spots of diversity are referred to as 'megadiversity nations'. India is among the world's 15 nations that are exceptionally rich in species diversity. The earth's biodiversity is distributed in specific ecological regions. There are over a thousand major eco-regions in the world. Of these, 200 are said to be the richest, rarest and most distinctive natural areas. These areas are referred to as the Global 200. It has been estimated that 50,000 endemic plants which comprise 20% of global plant life, probably occur in only 25 'hot spots' in the world. These hotspots harbor many rare and endangered species. Two criteria help in defining hotspots namely rich endemism and the degree of threat. To qualify as hotspots an area must contain at least 0.5 per cent or 1500 of the worlds 3,00,000 plants species as endemics.

3. Dams- benefits and problems

DAMS: It can be unequivocally stated that dams have made significant contributions to human development and the benefits derived from them have been considerable. Large dams are designed to control floods and to help the drought prone areas, with supply of water. But large dams have proved to cause catastrophic environmental damage. Hence an attempt has been made to construct small dams. Multiple small dams have less impact on the environment.

Benefits: Dams ensure a year round supply of water for domestic use and provide extra water for agriculture, industries and hydropower generation.

Problems: They alter river flows, change nature's flood control mechanisms such as wetlands and flood plains, and destroy the lives of local people and the habitats of wild plant and animal species, particularly is the case with mega dams. Some of the problems are mentioned below.

- Dam construction and submersion leads to significant loss of areable farmland and forest and land submergence
- Siltation of reservoirs, water logging and salination in surrounding lands reduces agricultural productivity
- Serious impacts on ecosystems - significant and irreversible loss of species and ecosystems, deforestation and loss of biodiversity, affects aquaculture
- Socio economic problems for example, displacement, rehabilitation and resettlement of tribal people.
- Fragmentation and physical transformation of rivers
- Displacement of people - People living in the catchment area, lose property and livelihood

- Impacts on lives, livelihoods, cultures and spiritual existence of indigenous and tribal people
- Dislodging animal populations
- Disruption of fish movement and navigational activities
- Emission of green house gases due to rotting of vegetation
- Large landholders on the canals get the lion's share of water, while poor and small farmers get less and are seriously affected leading to conflicts. Irrigation to support cash crops like sugarcane produces an unequal distribution of water.
- Natural disasters – reservoirs induced seismicity, flash floods etc and biological hazards due to large-scale impounding of water – increase exposure to vector brone diseases, such as malaria, schistosomiasis, filariasis

Q4. What are "intangible resources"? Differentiate between renewable and non-renewable resources.

Ans:-

"Intangible resources" or (Abstract resources) are the resources such as open space, information, diversity, satisfaction, serenity and beauty, which can be both exhaustible and inexhaustible. There are no upper limits of knowledge, information or beauty. But at the same time these can be destroyed easily. For example, a single and small piece of trash can destroy the beauty of any place.

Natural resources can be categorized on the basis of renewability:

A **non-renewable resource (also known as a finite resource)** is a resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes. An example is carbon-based, organically-derived fuel. The original organic material, with the aid of heat and pressure, becomes a fuel such as oil or gas. Fossil fuels (such as coal, petroleum, and natural gas), and certain aquifers are all non-renewable resources.

Metal ores are other examples of non-renewable resources. The metals themselves are present in vast amounts in the earth's crust, and are continually concentrated and replenished over millions of years. However their extraction by humans only occurs where they are concentrated by natural processes (such as heat, pressure, organic activity, weathering and other processes) enough to become economically viable to extract. These processes generally take from tens of thousands to millions of years. As such, localized deposits of metal ores near the surface which can be extracted economically by humans are non-renewable in human timeframes, but on a world scale, metal ores as a whole are inexhaustible, because the amount vastly exceeds human demand, on all timeframes. Though they are technically non-renewable, just like with rocks and sand, humans could never deplete the world's supply. In this respect, metal ores are considered vastly greater in supply to fossil fuels because metal

ores are formed by crustal scale processes which make up a much larger portion of the earth's near-surface environment than those that form fossil fuels, which are limited to areas where carbon-based life forms flourish, die, and are quickly buried. These fossil fuel-forming environments occurred extensively in the Carboniferous Period.

Renewable resources (Inexhaustible Resources), such as forests and fisheries, can be replenished or reproduced relatively quickly. The highest rate at which a resource can be used sustainably is the sustainable yield. Some resources, like sunlight, air, and wind, are called perpetual resources because they are available continuously, though at a limited rate. Their quantity is not affected by human consumption. Many renewable resources can be depleted by human use, but may also be replenished, thus maintaining a flow. Some of these, like agricultural crops, take a short time for renewal; others, like water, take a comparatively longer time, while still others, like forests, take even longer. Renewable resources are a part of Earth's natural environment and the largest components of its ecosphere. A positive life cycle assessment is a key indicator of a resource's sustainability. In 1962, Paul Alfred Weiss defined Renewable Resources as: "The total range of living organisms providing man with food, fibers, drugs, etc...".

[1]Renewable resources may be the source of power for renewable energy. However, if the rate at which the renewable resource is consumed exceeds its renewal rate, renewal and sustainability will not be ensured. The term renewable resource also describes systems like sustainable agriculture and water resources.

[2] Sustainable harvesting of renewable resources (i.e., maintaining a positive renewal rate) can reduce air pollution, soil contamination, habitat destruction and land degradation.

[3]Gasoline, coal, natural gas, diesel and other commodities derived from fossil fuels, as well as minerals like copper and others are non-renewable resources without a sustainable yield.

Q5. Define ecosystem. Give an account of the structure and function of an ecosystem.

Ans:-

Definition of ecosystem: The living community of plants and animals in any area together with the non-living components of the environment such as soil, air and water, constitute the ecosystem.

Or

The eco-system can be defined as any spatial or organizational unit including living organisms and non-living substances interacting to produce an exchange of materials between the living and non-living parts. The eco-system can be studied from either structural or functional aspects.

STRUCTURE OF ECO-SYSTEMS

Meaning of Structure

By structure of an eco-system we mean as under.

(i) The composition of biological community including species, numbers, biomass, life history and distribution in space etc.

(ii) The quantity and distribution of the non-living materials, such as nutrients, water etc.

(iii) Structure of an ecosystem the range, or gradient of conditions of existence, such as temperature.

Natural And Function of Structure of Eco-system

The structure of an ecosystem is in fact, a description of the species of organisms that are present, including information on their life histories, population and distribution in space. It guides us to know who's who in the ecosystem. It also includes descriptive information on the non-living features of ecosystem give us information about the range of climatic conditions that prevail in the area. From structural point of view all ecosystems consist of following two basic components:

1) Abiotic Substances (Non-Living Components)

The Abiotic substances include basic inorganic and organic compounds of the environment or habitat of the organism.

(a) Inorganic Components: The inorganic components of an ecosystem are as undercarbon dioxide, water, nitrogen, calcium, and phosphate. All of these are involved in matter cycles (biogeochemical cycles).

(b) Organic Components: The organic components of an ecosystem are proteins, carbohydrates; lipids and amino acids, all of these are synthesized by the biota (flora and fauna) of an ecosystem and are reached to ecosystem as their wastes, dead remains, etc.

(c) The climate, temperature, light, soil etc., are other abiotic components of the eco-system.

2) Biotic Substances (Living Components): This is indeed the trophic structure of any ecosystem, where living organisms are distinguished on the basis of their nutritional relationships. From this trophic (nutritional) standpoint, an ecosystem has two components:

(a) Autotrophic Component of Producers

These are the components in which fixation of light energy use of simple inorganic substances and build up of complex substance predominate.

(i) The component is constituted mainly by green plants, including photosynthetic bacteria.

(ii) To some lesser extent, chemosynthetic microbes also contribute to the build up of organic matter.

(iii) Members of the autotrophic component are known as eco-system producers because they capture energy from non-organic sources, especially light, and store some of the energy in the form of chemical bonds, for the later use.

(iv) Algae of various types are the most important producers of aquatic eco-systems, although in estuaries and marshes, grasses may be important as producers.

(v) Terrestrial ecosystems have trees, herbs, grasses, and mosses that contribute with varying importance to the production of the eco-systems.

(b) Heterotrophic Component or Consumers

These are the components in which utilization; rearrangement and decomposition of complex materials predominate. The organisms involved are known as consumers, as they consume autotrophic organisms like bacterial and algae for their nutrition, the amount of energy that the producers capture, sets the limit on the availability of energy for the ecosystem. Thus, when a green plant captures a certain amount of energy from sunlight, it is said to produce the energy for the ecosystem. The consumers are further categorized as:

(i) Macroconsumers:- Marcoconsumers are the consumers, which in a order as they occur in a food chain are, herbivores, carnivores (or omnivores).

(a) Herbivores are also known as primary consumers.

(b) Secondary and tertiary consumers, if preset, are carnivores of omnivores. They all phagotrophs that include mainly animals that ingest other organic and particulate organic matter.

(ii) Microconsumers:- These are popularly known as decomposers. They are saprotrophs (=osmotrophs) they include mainly bacteria, actinomycetes and fungi. They breakdown complex compounds of dead or living protoplasm, they absorb some of the decomposition or breakdown products. Besides, they release inorganic nutrients in environment, making them available again to autotrophs.

The biotic component of any ecosystem may be thought of as the functional kingdom of nature. The reason is, they are based on the type of nutrition and the energy source used.

The trophic structure of an ecosystem is one kind of producer consumer arrangement, where each "food" level is known as trophic level.

Decomposers

In the absence of decomposers, no ecosystem could function long. In their absence, dead organisms would pile up without rotting, as would waste products, It would not be long before and an essential element, phosphorus, for example, would be first in short supply and then gone altogether, the reason is the dead corpses littering the landscape would be hoarding the entire supply. The decomposers tear apart organisms and in their metabolic processes release to the environment atoms and molecules that can be reused again by autotrophic point of view. Instead they are important from the material (nutrient) point of view. Energy cannot be recycled, but matter can be. Hence it is necessary to feed Energy into ecosystem to keep up with the dissipation of heat or the increase in entrophy. Matter must be recycled again and again by an ecological process called biogeochemical cycle.

FUNCTION OF AN ECO-SYSTEM

For a fuller understanding of ecosystems a fuller understanding of their functions besides their structures is essential. The function of ecosystems includes the process how an eco-system works or operates in normal condition. From the operational viewpoint, the living and non-living components of ecosystem are interwoven into the fabric of nature. Hence their separation from each other becomes practically very much difficult. The producers, green plants, fix radiant energy and with the help of

minerals (C, O, N, P, L, Ca, Mg, Zn, Fe etc.) taken from their soil and aerial environment (nutrient pool) they build up complex prefer to call the green plants as converters or transducers because in their opinion the terms 'producer' form an energy viewpoint which is somewhat misleading. They contend that green plants produce carbohydrates and not energy and since they convert or transducer radiant energy into chemical form, they must be better called the converters or transducers. However, the term' producer' is so widely used that it is preferred to retain it as such.

While considering the function of an ecosystem, we describe the flow of energy and the cycling of nutrients. In other words, we are interested in things like how much sunlight plants trap in a year, how much plant material is eaten by herbivores, and how many herbivores carnivores eat.

The functions of Ecosystem are as under:

1. Transformation of Solar Energy into Food Energy

The solar radiation is major source of energy in the ecosystem. It is the basic input of energy entering the ecosystem. The green plants receive it and are converted into heat energy. It is lost from the ecosystem to the atmosphere through plant communities. It is only a small proportion of radiant solar energy that is used by plant to make food through the process of photosynthesis. Green plants transform a part of solar energy into food energy or chemical energy. The green plants to develop their tissues use this energy. It is stored in the primary producers at the bottom of trophic levels.

2. The Circulation of elements through Energy Flow

It is seen that in the various biotic components of the ecosystem the energy flow is the main driving force of nutrient circulation. The organic and inorganic substances are moved reversibly through various closed system of cycles in the biosphere, atmosphere, hydrosphere and lithosphere. This activity is done in such a way that total mass of these substances remains almost the same and is always available to biotic communities.

3. The Conversion of Elements into Inorganic Flow

The organic elements of plants and animals are released in the under mentioned ways:

(i) Decomposition of leaf falls from the plants dead plants and animals by decomposers and their conversion into soluble inorganic form.

(ii) Burning of vegetation by lighting, accidental forest fire or deliberate action of man.

When burnt, the portions of organic matter are released to the atmosphere and these again fall down, under the impact of precipitation, on the ground. Then they become soluble inorganic form of element to join soil storage, some portions in the form of ashes are decomposed by bacterial activities.

(iii) The waste materials released by animals are decomposed by bacteria. They find their way in soluble inorganic form to soil storage.

4. The Growth and Development of Plants

In the biogeochemical cycles are included the uptake of nutrients of inorganic elements by the plants through their roots. The nutrients are derived from the soil where these inorganic elements are stored. The decomposition of leaves, plants and animals and their conversion into soluble inorganic form are

stored into soil contributing to the growth and development of plants. Decompositions are converged into some elements. These elements are easily used in development of plant tissues and plant growth by biochemical processes, mainly photosynthesis.

5. Productivity of ecosystem

The productivity of an ecosystem refers to the rate of production i.e. the amount of organic matter, which is accumulated in any unit time. Productivity is of the following types:

(1) Primary productivity

(2) Secondary productivity

(3) Net Productivity

(4) Stability of Ecosystem

Q6. Discuss India's mega diverse biodiversity.

Ans:-

The countries with highest species richness or have a relatively large proportion of these hot spots of diversity are referred to as 'megadiversity nations'. India is among the world's 15 nations that are exceptionally rich in species diversity. The earth's biodiversity is distributed in specific ecological regions. There are over a thousand major eco-regions in the world. Of these, 200 are said to be the richest, rarest and most distinctive natural areas. These areas are referred to as the Global 200. It has been estimated that 50,000 endemic plants which comprise 20% of global plant life, probably occur in only 25 'hot spots' in the world. These hotspots harbor many rare and endangered species. Two criteria help in defining hotspots namely rich endemism and the degree of threat. To qualify as hotspots an area must contain at least 0.5 per cent or 1500 of the worlds 3,00,000 plants species as endemics.

Among the biologically rich nations, India stands among the top countries for its great variety of plants and animals, many of which are not found elsewhere. India has 350 different mammals (rated eight highest in the world), 1,200 species of birds (eighth in the world), 453 species of reptiles (fifth in the world) and 45,000 plant species, of which most are angiosperms, (fifteenth in the world). These include especially high species diversity of ferns (1022 species) and orchids (1082 species). India has 50,000 known species of insects, including 13,000 butterflies and moths. It is estimated that the number of unknown species could be several times higher. It is estimated that 18% of Indian plants are endemic to the country and found nowhere else in the world. Among the plant species the flowering plants have a much higher degree of endemism, a third of these are not found elsewhere in the world. Among amphibians found in India, 62% are unique to this country. Among lizards, of the 153 species recorded, 50% are endemic. High endemism has also been recorded for various groups of insects, marine worms, centipedes, mayflies and fresh water sponges.

	India's World Ranking	Number of species in India
Mammals	8th	350
Birds	8th	1200
Reptiles	5th	453
Amphibia	15th	182
Angiosperms	15th-20th	14,500

Apart from the high biodiversity of Indian wild plants and animals there is also a great diversity of cultivated crops and breeds of domestic livestock. This is a result of several thousand years during which civilizations have grown and flourished in the Indian subcontinent. The traditional cultivars included 30,000 to 50,000 varieties of rice and a number of cereals, vegetables and fruit. The highest diversity of cultivars is concentrated in the high rainfall areas of the Western Ghats, Eastern Ghats, Northern Himalayas and the North-Eastern hills. Gene-banks have collected over 34,000 cereals and 22,000 pulses grown in India. India has 27 indigenous breeds of cattle, 40 breeds of sheep, 22 breeds of goats and 8 breeds of buffaloes.

Q7. What is mining? Discuss the environmental effects of extracting and using mineral resources.

Ans:-

Minerals and their ores need to be extracted from the earth's interior so that they can be used. This process is known as mining. Mining operations generally progress through four stages:

(1) Prospecting: Searching for minerals.

(2) Exploration: Assessing the size, shape, location, and economic value of the deposit.

(3) Development: Work of preparing access to the deposit so that the minerals can be extracted from it.

(4) Exploitation: Extracting the minerals from the mines.

The environmental impact of mining includes erosion, formation of sinkholes, loss of biodiversity, and contamination of soil, groundwater and surface water by chemicals from mining processes. In some cases, additional forest logging is done in the vicinity of mines to increase the available room for the storage of the created debris and soil. Besides creating environmental damage, the contamination resulting from leakage of chemicals also affects the health of the local population. Mining companies in some countries are required to follow environmental and rehabilitation codes,

ensuring the area mined is returned to close to its original state. Some mining methods may have significant environmental and public health effects.

1. Impacts on water resources- Perhaps the most significant impact of a mining project is its effects on water quality and availability of water resources within the project area.
    - Acid mine drainage and contaminant leaching
    - Erosion of soils and mine wastes into surface waters
    - Impacts of tailing impoundments, waste rock, heap leach, and dump leach facilities
2. Impacts of mining on air quality- Airborne emissions occur during each stage of the mine cycle, but especially during exploration, development, construction, and operational activities. Mining operations mobilize large amounts of material, and waste piles containing small size particles are easily dispersed by the wind. Large-scale mining has the potential to contribute significantly to air pollution, especially in the operation phase. All activities during ore extraction, processing, handling, and transport depend on equipment, generators, processes, and
    - Incidental releases of mercury
    - Noise and vibration
3. Impacts of mining projects on wildlife

Wildlife is a broad term that refers to all plants and any animals (or other organisms) that are not domesticated. Mining affects the environment and associated biota through the removal of vegetation and topsoil, the displacement of fauna, the release of pollutants, and the generation of noise.

- Habitat loss
- Habitat fragmentation

4. Impacts of mining projects on soil quality

Mining operations routinely modify the surrounding landscape by exposing previously undisturbed earthen materials. Erosion of exposed soils, extracted mineral ores, tailings, and fine material in waste rock piles can result in substantial sediment loading to surface waters and drainage ways. In addition, spills and leaks of hazardous materials and the deposition of contaminated windblown dust can lead to soil contamination

5. Impacts of mining projects on social values

The social impacts of large-scale mining projects are controversial and complex. Mineral development can create wealth, but it can also cause considerable disruption. Mining projects may create jobs, roads, schools, and increase the demands of goods and services in remote and impoverished areas, but the benefits and costs may be unevenly shared. If communities feel they are being unfairly treated or inadequately compensated, mining projects can lead to social tension and violent conflict.

- Human displacement and resettlement
- Impacts of migration

Q8. What are the major sources of food? Discuss world food problems in detail.

Ans:-

Our food comes almost entirely from agriculture, animal husbandry and fishing i.e., - 76% from crop lands, 17% from range lands i.e., meat from grazing livestock and 7% - marine and fresh water i.e., fisheries. The FAO (Food & Agricultural Organization of UN) defines sustainable agriculture as the one which conserves land, water and plant and animal genetic resources, does not degrade the environment and is economically viable and socially acceptable. The report, "The Food Gap –the Impacts of Climate Change on Food Production: A 2020 Perspective", produced after a year-long assessment by America's Universal Ecological Fund (FEU-US), revealed that:

- Global food production would not meet the food requirements of the world's estimated 7.8 billion people by 2020.
- Food prices are expected to jump by 20% in the next ten years as prolonged droughts and floods take their toll on food production.
- The report, which looked at the impact of climate change on four cereals - wheat, rice, maize and soybean - pointed out that
    - global wheat production will experience a 14 percent deficit between production and demand
    - Rice production will experience 11 percent deficit, and
    - 9 percent deficit in maize production.
    - Soybean is the only crop showing an increase in global production, with an estimated five percent surplus.
- Current wheat production is estimated to decline to 663 million tons by 2020 yet 772.3 million tons is the estimated need at that time, creating a gap of 109 million tons.
- Rice is estimated to grow to 692.1 million tons by 2020 yet demand at that time is estimated at 775.1 million –creating a shortage of 82.9 million tons. Maize production stands at 826.2 million tons and is estimated to grow to 849.1 million tons by 2020 yet demand at that time is estimated at 933.7 million tons, creating a shortage of 85 million tons.

World Food Problems and Environmental Concerns:

1) Population growth: Food production in 64 of the 105 developing countries is lagging behind their population growth levels.
2) Poor agricultural practices: Poor environmental agricultural practices such as slash and burn, shifting cultivation, or 'rab' (wood ash) cultivation degrade forests.
3) Degradation of agricultural lands: Globally 5 to 7 million hectares of farmland is degraded each year. Loss of nutrients and overuse of agricultural chemicals are major factors in land

degradation. Water scarcity is an important aspect of poor agricultural outputs. Salinization and water logging has affected a large amount of agricultural land worldwide.

4) Our fertile soils are being exploited faster than they can recuperate.
5) Forests, grasslands and wetlands have been converted to agricultural use, which has led to serious ecological questions.
6) Use of genetically modified seed variety, without minding the conducive environment for such experimentation, will seriously affect the land ecosystem.
7) Our fish resources, both marine and inland, show evidence of exhaustion.
8) There are great disparities in the availability of nutritious food. Some communities such as tribal people still face serious food problems leading to malnutrition especially among women and children.
9) Loss of Genetic Diversity: Modern agricultural practices have resulted in a serious loss of genetic variability of crops. India's distinctive traditional varieties of rice alone are said to have numbered between 30 and 50 thousand. Most of these have been lost to the farmer during the last few decades as multinational seed companies push a few commercial types. This creates a risk to our food security, as farmers can loose all their produce due to a rapidly spreading disease. A cereal that has multiple varieties growing in different locations does not permit the rapid spread of a disease.
10) Food security: It is the ability of all people at all times to access enough food for an active and healthy life. It is estimated that 18 million people worldwide, most of whom are children, die each year due to starvation or malnutrition, and many others suffer a variety of dietary deficiencies. The earth can only supply a limited amount of food. If the world's carrying capacity to produce food cannot meet the needs of a growing population, anarchy and conflict will follow.

The following 3 conditions must be fulfilled to ensure food security

- Food must be available
- Each person must have access to it.
- The food utilized must fulfill nutritional requirements