

UNIT - 2

NATURAL RESOURCES: RENEWABLE & NON-RENEWABLE

A. Very short type questions & answers (1 mark each)

Q1. Name four Natural Resources.

Ans: Air, water, Rain, sunlight, land, Forests, Vegetation, animals, Coal, petroleum, Natural Gas (write any four from the following).

Q2. Where in India Shifting cultivation is practiced?

Ans: Shifting cultivation is practiced in the Eastern Ghats & North-Eastern states of India.

Q3. What are Dams?

Ans: Dams are a kind of barrier constructed across a river to hold back water and raise its level, forming a reservoir which is used to generate hydroelectricity or for water supply in order to meet the basic demands of irrigation or supply to houses & Industrial plants, etc.

Q4. What percentage of water on Earth is fresh water?

Ans: 2.5%

Q5. What percentage of worldwide water is used in agriculture?

Ans: 70%

Q6. What do you mean by ground water?

Ans: The rain water that percolates through the pores under the ground and locates in the subsurface pore spaces of the soil and rocks beneath the ground is called ground water.

Q7. What do you mean by floods?

Ans: Floods are the temporary overflow of water that submerges the land which is usually dry in normal days. It may be due to natural factors viz. heavy rain, tsunamis, etc. or by human activities viz. construction of Dams, release of greenhouse gases which in turn leads to the melting of polar ice or snow.

Q8. What condition of land is called drought?

Ans: Drought is a period of time when an area or region experiences below-normal precipitation. The lack of adequate precipitation, either rain or snow, can cause reduced soil moisture or groundwater, diminished stream flow, crop damage, and a general water shortage.

Q9. What do you mean by Renewable Energy Resource?

Ans: The energy resources which are naturally replenished on a human timescale and which can be used time and again are called Renewable Energy Resources. They are also known as virtually inexhaustible resources. The examples of Renewable Energy Resources are Sunlight, wind, rain, tides, geothermal heat, etc.

Q10. What do you mean by Non-Renewable Energy Resource?

Ans: The energy resources which are limited and cannot naturally replenish themselves on a human timescale and which will get exhausted soon if overexploited are called Non-Renewable Energy Resources. They are also known as exhaustible resources. The examples of Non-Renewable Energy Resources are mostly the fossil fuels: coal, petroleum & Natural Gas, Nuclear energy, etc.

B. Short type questions & answers (2 marks each)**Q1. Define Land Resources.**

Ans: Land resources can simply be defined as the resources belonging to the land and which can be obtained as per our requirements from the land. Land resources include all those features and processes of the land, which can, in some way, be used to fulfill certain human needs. These resources are numerous and complex, some of which are found in impure form associated with other substances, which needs to be processed for obtaining the purest form of that valuable resource or conversion into a desired product.

Other example of land resources includes the land itself which is available for exploitation viz. non-agricultural lands for construction works i.e. construction of buildings, factories, developing townships, etc.

Examples of land resources are -trees (give wood, food, rubber, medicines etc), soil (required to grow plants), minerals and ores (gold, silver, mica, zinc, copper etc), precious stones (diamonds, ruby etc.), fuel (coal, petroleum, natural gas), diverse flora, fauna and some useful microorganisms.

Q2. What do you mean by soil erosion?

Ans: Soil erosion is defined as the removal or wearing away of the topsoil of earth as well the reduction in the quality of the soil due to natural and anthropological factors.. Topsoil is the top layer of soil and is the most fertile because it contains the most organic, nutrient-rich materials. Various factors affect the erosion of the top layer of soil, out of which the natural factors are heavy wind, impact of heavy rain, surface run off, overgrazing, landslides, floods etc., while the artificial or man-made factors include extensive farming, waste spills from factories, logging, mining, construction works, use of bioweapons, recreational activities, etc.

The rate of soil erosion depends upon the intensity of its affecting factors over a period of time. The loss of soil from farmland may be reflected in reduced crop production potential, loss of habitat of useful microorganisms, lower surface water quality and damaged drainage networks. Soil erosion is a major concern for the sustenance of human beings as well as they are dependent on the resources influenced by the soil.

Q3. Briefly describe the factors that affect the soil erosion.

Ans: Various natural and artificial factors are responsible for the soil erosion. Some of which are described as follows:

A. Natural factors: Some of the natural factors affecting soil erosion are:

- i. **Climate:** The amount and intensity of precipitation is the main climatic factor governing soil erosion. The direct impact of heavy rain in locations where the soil is not well protected, anchored by the vegetation cover leads to the erosion of the soil.
- ii. **Topography:** The topography of the land determines the velocity of the surface runoff, which in turn determines the rate and extent of erosion of the soil. Longer, steeper slopes are most susceptible to very high rate of erosion during heavy rains than the shorter and less steep slopes.
- iii. **Floods:** The water current washes away the nutrient rich layer of the soil, prolonged flood gives rise to water logging condition. As a result, it obstructs the growth of any vegetation and removal of the top soil thereby leading to soil erosion.
- iv. **Overgrazing:** Overgrazing by cattles also has an impact on the soil. It leads to the loosening of the anchorage of the soil to the above grasses, thereby getting exposed to the harsh environment factors.

B. Man-Made factors: Some of the Man-made factors affecting soil erosion are:

- i. **Agriculture activities:** Tilted farmland is very susceptible to soil erosion from rainfall, due to the destruction of vegetative cover and loosening of

the soil during ploughing, clearing of land for shifting cultivation is one of the major factors affecting the soil, etc.

- ii. **Deforestation:** Severe soil erosion occurs in a deforested land causing stream sedimentation and loss of nutrient rich top soil. In an undisturbed forest, the mineral soil is protected by a layer of leaf litter and an humus layer that cover the forest floor. These two layers form a protective mat over the soil that absorbs the impact of rain drops.
- iii. **Urbanization:** Urbanization is a major contributing factor affecting the soil erosion processes—first by denuding the land having vegetation cover, altering drainage patterns and compacting the soil during construction by covering the soil with an impermeable layer of concrete that increases the amount of surface runoff and in turn increases surface wind speeds.
- iv. **Large scale projects:** The large scale projects like setting up of industries, construction of dams, mining activities rapidly leads to the erosion of fertile soil cover directly or indirectly. In this process, a massive area of land is cleared or submerged leading to erosion by various ways.

Q4. How can we prevent soil erosion?

Ans: Some of the most common methods for preventing soil erosion are as follows:-

- i) The most effective method for prevention of soil erosion is to increase vegetative cover on the land, which helps prevent both water and wind erosion.
- ii) Terracing is found to be extremely effective means of erosion control, which has been practiced for thousands of years.
- iii) Windbreaks that is rows of trees and shrubs that are planted along the edges of agricultural fields against winds, results in the prevention of soil erosion.
- iv) Counter farming practices tends to slow down the extent of soil erosion by slowing the speed of flowing water.
- v) Proper water drainage system has also proved to be an effective measure to check soil erosion.

Q5. What are causes of desertification?

Ans: The common causes of desertification are as follows:-

- i) The immediate cause of desertification is the loss of most vegetation, which directly affects the rate and intensity of rainfall.
- ii) The loss of vegetation is driven by a number of factors, alone or in combination such as drought, climatic shifts, tillage for agriculture, overgrazing & deforestation for fuel or construction purposes.

- iii) Many scientists conclude the fact that overgrazing i.e. when too much of vegetation is eaten up by cattle, is one of the most common cause of desertification.
- iv) Heavy winds adds to the rapid erosion of top fertile layers of soil thereby making the area unfavourable for any plant growth and other useful-microorganisms, which when occurs in a greater extent, ultimately leads to desertification.

Q6. Briefly discuss the effects of deforestation (desertification) due to timber logging?

Ans: The effect of (desertification as a result of) deforestation due to timber logging are as follows:-

- i) The increase of timber logging instantly directly affects the overall animal species richness; which lends to decline in the population.
- ii) Habitat loss is one of the greatest threats to biodiversity, especially in tropical rainforests where over 50% of all of the world's documented animal and plant species are found.
- iii) Timber logging also directly impacts soil and hydrological cycle leads to increase in water runoff and soil erosion.
- iv) At the macro level, deforestation by timber logging results in reduction of carbon sequestration capacity, which in turn contributes to climate change.
- v) Deforestation from timber logging and timber conversion in the tropics of accounts from approx. 15% of global greenhouse emission annually.
- vi) Deforestation from a clearcut timber logging in highly disruptive to biodiversity. Due to removal of seed sources, clearcut timber logging prevents the natural regrowth of endemic species.

Q7. What do you mean by shifting cultivation?

Ans: Shifting cultivating is an agricultural system in which plots of land are cultivated temporarily, then abandoned and allowed to revert their natural vegetation while the cultivator moves to another plot. It is an age-old practice in the Eastern Ghats and the Northern States pf India. Orissa accounts for the largest area under shifting cultivation in the hills slopes of such areas.

The shifting cultivation is generally practices in the following sequence:-

- i) Selecting a forest patch & clear fell that vegetation normally in December & January.
- ii) Burning of the felled vegetation. The herbs, shrubs, twigs & branches are burnt in February & March.
- iii) Sowing of seeds, by dibbling, generally of cereals, vegetable and soil in April-May.
- iv) Continuing cultivation for a few years.
- v) Abandoning the cultivated site & sifting to other forest sites.

- vi) Returning to the former site, and once again practice shifting cultivation on it.

Q8. Write briefly the impact of shifting cultivation on environment?

Ans: Some of the impact of shifting cultivation on environment are as follows:-

- i) The evil effects of shifting cultivation are devastating and far-reaching in degrading the environment and ecology of these regions.
- ii) The earlier 15-20 year cycle of shifting cultivation on a particular land has reduced to 2-3 years now. This has resulted in large-scale deforestation, soil and nutrient loss and invasion by weeds and other species.
- iii) The indigenous biodiversity has been effected to a large extent.
- iv) Frequent shifting from one land to the other has affected the ecology of these regions.
- v) The area under natural forest has declined as a consequence of shifting cultivation.
- vi) The fragmentation of habitat, local disappearance of native species, invasion by exotic weeds & other plants are some of the other ecological consequences of shifting cultivation.

Q9. Mention the impacts of Dams on environment?

Ans: The impacts of Dams on environment are as follows:-

- i) Dams construction results in displacing communities as the reservoir area is flooded
- ii) Flooding of the physical landscape transforms various ecological processes, such as hydrological cycles and species composition.
- iii) The construction of Dams converts free flowing rivers into permanently flooded water bodies. This environmental disturbance affects organisms that are adapted to specific flooding regimes, leading to changes in local ecology.
- iv) Dams prevent fish species from migrating upstream, disrupting reproduction cycles.
- v) Exotic species viz. aquatic plants can quickly colonize newly inundated areas, and restrict water movement and oxygenation, while pre-existing ecologies are disrupted.
- vi) People have to be displaced causing change in life style and customs, even causing emotional scarring.

Q10. What are the effects of Drought on environment?

Ans: Some of the effects of drought on environment are as follows:

- i) The land in which the plant life is growing may be badly damaged due to drought.

- ii) A cultivable land transforms into an uncultivable land as a result of drought.
- iii) It affects the living organisms with respect to their survival and existence.
- iv) In adverse condition, droughts may lead to desertification.
- v) The diversity of life forms is affected due to prolonged drought conditions.
- vi) The inhabitants who are solely dependent upon drought affected land tend to suffer the most and in worst scenario may starve to death.

C. Long type questions & answers (5 marks each)

Q1. Write a note on Land degradation.

Ans: Land degradation can be defined as the decline in the overall quality of the soil, water or vegetation condition primarily caused by human activities. It is the process in which the value of the biophysical environment is affected by one or more combination of human-induced process acting upon the land viz. deforestation, clearing of land, underground explosive testing, mining, release of chemicals and untreated waste into the land, etc.

Land degradation is viewed as any undesirable changes in the quality or characteristics of the land, disturbance to the land perceived to be deleterious or undesirable. Both Natural and Human-Induced factors contribute to land degradation processes, however the human-induced factors contribute to rapid land degradation as compared to the natural factors.

Human induced land degradation has direct implications upon agronomic productivity, the environment and its effect on food security. In addition to a large number of useful products obtained from land, the wild-species that inhabits the land are found to have potential components within them in the form of phytochemicals, substances they synthesize for carrying out various defensive mechanisms, etc. which have been proven to be of great aid for mankind in combatting various diseases. It is estimated that upto 40% of the world's agricultural land is seriously degraded. A large number of land areas, in which the crops are cultivated are required to be checked, maintained and protected so as to ensure continuous supply of the food resources.

Q2 Write down the important attempts made by the govt. to minimize shifting cultivation.

Ans: The important attempts made by the govt. to minimize shifting cultivation

- i) Arable lands are provided to the tribals for carrying out agriculture and also settle in the area.

- ii) An Agroforestry project known as Nagaland Environment Protection for Economic Development (NEPED) funded by Canadian International Development Agency (CIDA) through India-Canada Environment Facility (ICFE) was initiated in 1995 to make Nagaland self-sufficient in Agroforestry.
- iii) By encouraging cooperative efforts for carrying out forest based activities, i.e. making baskets, rope making, cane furniture processing of minor forest produce, honey collection, etc. making it commercially viable by providing proper marketing facilities. This will not only discourage tribals from practicing shifting cultivation but will help them monetarily.
- iv) By forming Village Forest Committees for the protection and development of degraded forests.
- v) By promoting activities like the Joint Forest Management and Social forestry practices.
- vi) By creating awareness about the ill-effects and consequences of such cultivation practices.

Q3. Write five differences between renewable and non-renewable energy resources.

Ans: Five differences between renewable and Non-renewable energy resources are as follows:

RENEWABLE ENERGY RESOURCES	NON-RENEWABLE ENERGY RESOURCES
They are present in the atmosphere of the earth.	They are typically found in the underground layers of the earth.
They are replaced by nature automatically in a short period of time	They cannot be replaced by nature during the time of human life-span.
They are inexhaustible and are abundant in nature.	They are scarce and can get exhausted by overuse.
The resources are obtained very easily at free of cost or are available at very low cost.	The resources are very costly and are not obtained easily.
They do not affect the environment; don't cause any climate change and do not release any pollutant in the environment.	They seriously affect the environment by causing climate change through release of various pollutants in the environment.

Q4. Write about the Alternative Energy resources.

Ans: Alternative energy can be defined as the energy source that is an alternative to the fossil fuel. These alternatives are intended to address concerns about the non-renewable, exhaustible resources - fossil fuels, such as its high Carbon dioxide emissions, an important factor in global warming and other agents releasing the

green house gases. Marine energy, hydroelectric, wind, geothermal and solar power are all alternative source of energy. The alternative energy tends to minimize the impacts generated from the products of non-renewable resources so as to maintain a balance in the nature.

The existing types of Alternative Energy Resources are as follows:-

- i) **Hydroelectricity:** The Impact of falling water is captured & electricity is generated through the use of water turbines and generators.
- ii) **Nuclear Energy:** The energy stored in the atomic bonds of heavy elements is obtained as a result of nuclear fission and used for generating electricity.
- iii) **Wind Energy:** It is the generation of electricity from wind, commonly using propeller-like turbines.
- iv) **Solar Energy:** The light energy from sunlight is utilized to convert it into thermal (heat) energy or directly into electricity via photovoltaic devices.
- v) **Geothermal Energy:** The utilization of earth's internal heat commonly found in geothermal geysers to generate electricity.
- vi) **Biofuel & Ethanol:** They are plant derived gasoline substitutes for powering vehicles.
- vii) **Hydrogen:** Used as a carrier of energy, produced by various technologies such as cracking of hydrocarbon or water electrolysis and are used for propelling rockets engines and other spaceflights.

Q5. Write down a note on mining impact of mining on environment.

Ans: Mining can be defined as the extraction of minerals and metals from earth. Magnesium, copper, tin, nickel, gold, silver, diamond, iron, ore, aluminium ore, etc. are some of the examples of what are mine. Mining is a profitable business. Not only the mining companies prosper, but also the governments make money from revenues. Workers also receive income and benefits. Mining is generally very destructive to the environment. It is one of the main causes of deforestation.

Some of the major Impacts of mining are as follows:-

- i) The major consequence of mining is severe deforestation, which results in the loss of biodiversity.
- ii) Mining leads to emission of dust, suspended particles and gases which cause severe air pollution.
- iii) Mining leads to release to harmful trace elements like cobalt, lead, cadmium, etc. which contaminates surface water. It also contaminates the ground water due to seepage and infiltration of leached drainage.

- iv) Mining leads degradation of soil quality, fertility and also making soil toxic. It disturbs the natural habitat of living organisms and affects the balance of ecosystem.
- v) Mining causes degradation of land resources. Mining directly results in the loss of landscape and natural ambience. It affects the vegetation drastically, by hampering their support systems.
- vi) Mining affects the inhabitants of its surroundings due to its continuous extraction process.

Q6. Describe the importance of Alternative Energy Resources.

Ans: Alternative Energy Resources are important because of the following reasons:-

1) Environmental impacts:

Fossil fuel takes millions of year to form, and only seconds to be utilized. When fossil fuels are burnt, they emit carbon which traps heat in our earth's atmosphere. The harmful gases in turn create concern about the growth and survival of various living organisms inhabiting the planet. The conventional source of energy is not only costly but also drastically effects the environment in several ways viz. climatic imbalance, ozone layer depletion, corrosive effects, loss of biodiversity, occurrence of epidemical diseases, loss of life and property, etc. Alternative sources of energy tend to minimize these unfavorable pathetic outcomes. The positive aspects of use of the alternative resources can be summarized by two lines, Firstly, they are available at low or free costs, secondly, they do not pollute the environment i.e. they are environment friendly and hence the growth and survival of the inhabiting species remains unaffected.

2) Health impacts:

Various health effects are noted time-to-time as a consequence of the use of non-renewable resources viz. minamata disaster, occupational health hazards like anthracosis, silicosis, bysinosis, bagassosis, etc., disease outbreaks which includes the water borne diseases like cholera, dysentery, typhoid, etc, Ozone layer depletion, smog, SPM generation which causes serious respiratory diseases and many more due to polluted environment. Any abnormal change in the environment directly or indirectly affects the health and lives of the living organisms inhibiting and dependent both on land and water resources for sustaining their lives. The use of DDT-a non-biodegradable substance has led to the loosening of the hardness of the egg-shells of the birds that feeds on aquatic organisms. It is estimated that over seven million people die every year from pollution due to vehicular and industrial emission. The emission of harmful substances from coal, mercury, lead industries,

etc. has shown to effects the living organisms both physically and physiologically. The alternative sources of energy in this regard will act as a boon in reducing such health hazards.

Q7. Define deforestation. Describe the causes of deforestation.

Ans: Deforestation can be defined as the clearing of trees, transforming a forest into cleared land. The main causes of deforestation are agriculture, shifting cultivation, timber logging, mining, increase in human population, urbanization, industrialization, construction of dams, roads, forest fire, overgrazing etc.

The consequence of deforestation are floods, direct impact of heat and rain on soil, loss of biodiversity, displacement of indigenous communities, climate change, economic loss and several health issues.

The principal causes of deforestation are as follows:-

- i) **Expansion of agriculture:** The increase in demands for agricultural products brought more and more land under cultivation. The forests are cleared, grasslands are ploughed, marches are drained and even land water is reclaimed. Such expansion happened at the cost of deforestation, which is marked with ecological destruction.
- ii) **Shifting cultivation:** Shifting cultivation is considered as one of the major reasons for deforestation in which forests are converted to barren land by slash and burn method.
- iii) **Firewood collection:** Majority of the rural population depends on wood as the to cook and provide heat in chilly winter. Firewood collections contribute to a certain extents to the depletion of tree cover.
- iv) **Timber logging:** Commercial timber logging contribute extensively to deforestation. Natural forests are being exploited for obtaining timbers by contractors, large companies viz. sports, furniture, etc. for commercial benefits.
- v) **Industrialization:** Growth of industries have also contributed for deforestation. Forests patches are cleared for establishment for new industries.
- vi) **Urbanization:** The forests lands on the suburbs of towns and cities are being cleared for establishment for new industries.
- vii) **Large scale development projects:** Large scale development projects like construction of Highways, Dams, Amusement parks, Artificial lakes, etc. have also contributed to the deforestation.

Q8. Discuss the serious impact of deforestation on tribal population.

Ans: The serious impact of deforestation on tribal population is discussed below:-

Man has survived in the midst of nature depending on it for various resources and by utilizing those for sustaining their livelihood. The tribal are the ones who live

in close contact with the nature, the population lives in harmony with the forests/nature. They are connected to the forests both spiritually and emotionally as well. They obtain various useful forests resources from their surrounding for survival and aid viz. food, shelter building materials, wood for cooking, for construction purposes, medicines, honey, etc. The sacred groves are of great spiritual interest for the local inhabitants and are psychologically and emotionally connected to it as well.

The Major impact of deforestation on the tribal population is the destruction of their homeland. The impact of deforestation to a greater extent led to the displacement of the local inhabitants from their natural habitats as a result of large scale development projects like construction of highways, dams, transformation of the area into parks, institutions of national importance, clearing of the vegetation cover for the extraction of natural resources through mining, oil extraction, blasting etc., The loss of habitat and the resources due to human activities has led to negative psychological impact and emotional stress among the tribal population. The human induced factor results in changes in the physical, biological and chemical composition and characteristics of the area, thereby making the area unsuitable, unfavourable for living.

Q9. Write a note on the type of Droughts.

Ans: The four important types of drought are as follows:-

- i) **Meteorological Droughts:** This type of drought is specific to some regions where the annual rainfall is below 51 cm (in average). Meteorological drought is defined usually on the basis of the degree of dryness (in comparison to some “normal” or average amount) and the duration of the dry period. Meteorological drought happens when dry weather patterns dominate an area. Meteorological drought can begin and end rapidly.
- ii) **Agricultural Drought:** This type of drought relates to not enough moisture content at the region of planting of crops, which in turn may hinder germination leading to low plant population and a reduction in yield. Agricultural drought happens when crops become affected.
- iii) **Hydrological Drought:** This type of drought refers to the persistently low water volumes in streams, rivers and reservoirs. Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels, usually after many months of meteorological drought. The hydrological drought takes much longer to develop and then recover.
- iv) **Socio-economic Drought:** Socio-economic drought relates the supply and demand of various commodities to drought. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Because of the natural variability of climate, water supply is ample in

some years but unable to meet human and environmental needs in other years. It occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply.

- v) **Ecological Drought:** A more recent effort focuses on ecological drought, defined as "a prolonged and widespread deficit in naturally available water supplies, including changes in natural and managed hydrology, that create multiple stresses across ecosystems."

Q10. Discuss the principal type of floods.

Ans: The principal types of floods are as follows:-

- i) **Areal:** The flooding on flat or low-lying areas due to overflow of river water, collapse of dam, heavy rainfall or snowmelt, etc. The impact of which is more rapid as the water inflows from the surrounding higher regions and it can either infiltrate or runoff. The excess accumulates in place is sometimes to hazardous depths.
- ii) **Riverine:** This type refers to the floods occurring in all types of river and stream channels. The rise of the water level is mainly due to heavy rainfall over a prolonged period of time. Conditions where overland flow occurs in titled fields, it can result in a muddy, flood, where sediments are picked up by runoff and carried as suspended matter or bed load.
- iii) **Estuarine and Coastal:** Flooding in estuaries is commonly caused by a combination of sea tidal surges caused by winds and low biometric pressure, and they may be exacerbated by high upstream river flow. Coastal areas may be flooded by storms events at sea, resulting in waves over-topping defenses or in severe cases by tsunami or tropical cyclones.
- iv) **Urban flooding:** Urban flooding is the inundation of land or property in a built environment, particularly in more densely populated areas, caused by rainfall overwhelming the capacity of drainage system - which is very essential for clearing the inflowing water and preventing it from flooding the area.
- v) **Catastrophic:** Catastrophic flooding is related to flooding conditions which arises due to landslide, earthquake, volcanic eruption, major infrastructure construction defects viz. collapse of dam, etc.