

# Chapter 9 - Environment And Sustainable Development

## Question 1:

What is meant by environment?

## Answer:

Environment refers to all the surroundings which have an impact on human lives. It is the sum total of the surroundings and resources that effect our existence and quality of life. It includes all the biotic and abiotic factors. Biotic factors include all the living creatures like plants, animals, forests, etc. while abiotic factors include all non-living things like air, water, land, etc. that are provided free of cost by nature. Biotic and abiotic both make up our surroundings and impact our existence and quality of life. In other words, environment encompasses the r the biotic and abiotic components and their relations.

## Question 2:

What happens when the rate of resource extraction exceeds that of their regeneration?

## Answer:

Environment performs several functions, but its essential function of sustaining life carries much significance. Environment provides us with life supporting elements like Sun light, soil, water and air. On extracting resources at a more rapid pace than its regeneration, the carrying capacity of the environment reduces, leading to a failure in its life sustaining function. This results in environmental crises, one of the common problems faced by almost all the countries of the world.

## Question 3:

Classify the following into renewable and non-renewable resources

(i) trees (ii) fish (iii) petroleum (iv) coal (v) iron-ore (vi) water

## Answer:

Renewable resources are those inexhaustible resources capable of being replenished easily. Water, trees and fish are the renewable resources.

Non-renewable resources are those resources that are likely to be exhausted or depleted on use. Petroleum, coal and iron ore are non-renewable resources. The pace of re-occurrence of these resources is slower than that of their exploitation.

## Question 4:

Two major environmental issues facing the world today are\_\_\_\_\_ and\_\_\_\_\_.

## Answer:

Two major environmental issues facing the world today are global warming and ozone depletion.

Global warming refers to the phenomenon of sustained increase in global temperature due to environmental pollution and deforestation. It is caused by the emission of Green House Gases, particularly, carbon dioxide. The increase in the level of carbon dioxide raises the temperature of the earth surface, accelerating the melting of polar ice. This leads to the rise in the sea level. Thus, the disturbed ecological balance leads to increasing natural calamities, posing a threat to human survival.

Ozone acts as a cover for the earth surface that is very essential for the sustenance of life. It prevents the harmful ultra violet radiations from penetrating the earth surface. But its depletion is becoming a global concern these days. This is due to the excessive use of cooling substances in the air conditioners and the refrigerators. As ozone depletes, the possibility of ultra violet radiations penetrating to the earth surface increases, posing a threat to the life on earth.

### **Question 5:**

How do the following factors contribute to the environmental crisis in India? What problem do they pose for the government?

- (i) Rising population
- (ii) Air pollution
- (iii) Water contamination
- (iv) Affluent consumption standards
- (v) Illiteracy
- (vi) Industrialization
- (vii) Urbanization
- (viii) Reduction of forest coverage
- (ix) Poaching
- (x) Global warming.

### **Answer:**

#### **(i) Rising Population**

Rising population has exerted an excessive burden on the environment in terms of two basic aspects. The intensive and extensive extraction of both renewable and non-renewable resources has led to exhaustion of the vital resources. Also, the explosive population size has triggered excessive demand for housing, thereby, resulting in widespread deforestation and fast depletion of other natural resources leading to ecological imbalances. Therefore, it is high time for the Indian government to take preventive measures to control population explosion.

#### **(ii) Air Pollution**

Air consists of oxygen that supports life. Air pollution implies contamination of air, i.e. absence of fresh air (oxygen) to breathe. Various pollutants like CO<sub>2</sub>, CO, SO<sub>2</sub>, SO, etc. pollutes air. Air pollution causes hypertension, asthma, respiratory and cardio-vascular problems. Thus, the Indian government

should take various steps to control air pollution, avoid deforestation, increase health investment and also search for new alternative pollution free technology such as CNG, etc.

### **(iii) Water Contamination**

Contamination of water or pollution of water is posing a serious threat to human life. It is one of the principal causes of all deadly diseases such as diarrhea, hepatitis, cholera, etc. It occurs due to dumping of industrial waste, agricultural waste and sewerage into the water bodies. Thus, the Indian government should put a check on wastewater disposal. This calls for high capital investment for installation and maintenance of purifier machines.

### **(iv) Affluent Consumption Standards**

Affluent Consumption Standards have placed a huge stress on the environment in terms of resources supply and assimilation of waste. The resources have become extinct and wastes generated are beyond the absorptive capacity of the environment leading to environmental crises. The government is compelled to spend huge amounts on research and development to explore alternative environment friendly resources. Also, upgradation of environmental quality entails huge cost

### **(v) Illiteracy**

Man, if illiterate will not use the resources judiciously that will ultimately lead to overuse or misuse of the scarce resources. The resources can be judiciously and efficiently exploited (with minimum waste) only when people are aware of and skillful in utilising the resources. Otherwise lack of knowledge and skills may lead to excessive extraction of resources and, thereby, its misuse. Thus, the government should take measures to create awareness and spread technical knowledge among people about various efficient and economising methods.

### **(vi) Industrialisation**

Industrialisation, on one hand, enhances our living standards but, on the other hand, it causes deforestation, depletion of natural resources. In the blind rage to achieve economic development, industrialisation acts as a catalyst. In order to speed up the process of industrialisation, natural resources are exploited at a rapid pace. More trees are being felled and, increasing volume of toxics and industrial wastes are dumped into the water bodies. All these culminate to ecological imbalances posing threat to sustainable economic development. Thus, the government should take measures to check undue and unnecessary industrial growth in order to restore ecological balance.

### **(vii) Urbanisation**

Urbanisation, on the one hand, infuses modernisation of lifestyle but, on the other hand, it leads to deforestation. In order to meet the growing demand for houses, more trees are to be felled, decreasing the land-per-man ratio. Rapid urbanisation puts an excess burden on the natural resources, causing depletion. Urbanisation also reduces the availability of land for farming purpose and lowers farm outputs. Hence, the government should take measures to mitigate the impact of urbanisation by promoting small and cottage rural industries, rural infrastructural development, thereby, reducing the rural-urban migration. Further, the government should also promote afforestation and most importantly, adopt measures to arrest population explosion.

### **(viii) Reduction of forest coverage**

The need for reduction of forest coverage or deforestation arises due to the growing demand for land, wood, rise in population and river valley projects. Deforestation leads to reduction in oxygen level in air, soil erosion, climate change and global warming due to rise in the CO<sub>2</sub> level. Thus, measures are

needed to promote afforestation, opening up of sanctuaries and national park such as Jim Corbett National Park.

#### **(ix) Poaching**

Poaching is the illegal capturing, killing and hunting of animals. Due to this, many animals are on the verge of extinction. The excessive hunting and killing of animals result in serious ecological imbalances. Thus, in order to save the rare species such as Tiger, Asian Elephants, Grevy's Zebra, etc. more sanctuaries and national parks are to be set up. There is also need for various environmental legislations like Endangered Species Act in the USA that imposes strict penalties on the law breakers.

#### **(x) Global warming**

Global warming refers to the phenomenon of sustained increase in global temperature due to environmental pollution and deforestation. It is caused by the emission of Green House Gases that include, particularly, carbon dioxide. The increase in the level of carbon dioxide raises the temperature of the earth surface. This risen temperature accelerates the melting of polar ice that further leads to the rise in the sea level. Thus, the incidence of natural calamities rises due to disturbed ecological balance, thereby, posing a threat to human life.

#### **Question 6:**

What are the functions of the environment?

#### **Answer:**

The environment performs the following four dynamic functions:

- 1. Offer Production Resources:** Environment provides us with wide tangible resources like minerals, water and soil. These are the gifts of nature. These resources act as an input for converting natural resources into productive and useful things. In other words, environment provides input for production that enhances human life qualitatively.
- 2. Sustains Life:** Environment provides us with vital ingredients like sun, soil, water and air that are necessary for the survival of life. Absence of these essential elements implies absence of life. It supports biodiversity.
- 3. Assimilates Waste:** The activities of production and consumption generate waste. This waste in the form of garbage is absorbed by the environment automatically.
- 4. Enhances Quality of Life:** Environment includes surroundings such as rivers, oceans, mountains and deserts. It provides scenic beauty that man admires in life and adds to the quality of human life.

#### **Question 7:**

Identify six factors contributing to land degradation in India.

#### **Answer:**

Degradation of land refers to the gradual but consistent loss of fertility.. This is emerging as a serious concern in the context of environmental issues in India. The following are the factors that contribute to land degradation in India:

**a. Soil Erosion:** The removal of upper layer of the soil caused by agents like strong winds or floods is termed as soil erosion. The top most layer of the soil carries major and essential nutrients like nitrogen, phosphorous and potassium. Consequently, the loss of this layer deteriorates the quality and productivity of land.

**b. Alkalinity and Salinity of Soil:** The salinity and alkalinity is caused by the problem of water logging. Water logged on the top layer of soil absorbs all the nutrients present in the soil, thereby, reducing its fertility.

**c. Deforestation:** The growing population along with their ever growing demand lead to large scale destruction of forest cover. The reduction of forest coverage leads to soil erosion that in turn causes climate change

**d. Shifting Cultivation:** The practice of shifting cultivation and subsistence farming carried by the small and the marginal farmers result in the replenishment of soil nutrients and, hence, its fertility.

**e. Excessive use of Fertilisers:** The excessive use of chemical fertilisers, insecticides and pesticides lowers the quality and fertility of soil.

**f. Desertification:** The spread of deserts in arid and semi arid areas is referred to as desertification. It occurs due to overgrazing of the animals. This results in the reduction of lush green areas that in turn leads to replenishment of soil fertility.

#### Question 8:

Explain how the opportunity costs of negative environmental impact are high.

#### Answer:

Opportunity cost is the cost that is foregone when we make a choice or a decision. If a piece of land is to be used for wheat production then the production of say, rice, is to be sacrificed. The loss of rice production is the opportunity cost of producing wheat. In the similar way, the cost of negative environment is the opportunity cost of huge expenditure incurred on health and searching new alternatives. This is explained elaborately in the following paragraph;

When the resources are extracted at a more rapid pace than its regeneration, then we say that the carrying capacity of the environment reduces. In such situation, environment fails to perform its function of sustaining life, thereby, resulting in environmental crises. In other words, environmental crises are an aggregate outcome of excessive exploitation of natural resources and excessive generation of wastes. Therefore, there arises a need for exploration of new alternative eco-friendly resources to avoid environmental crisis. Moreover, environmental crises lead to greater incidence of respiratory and water borne diseases, necessitating higher health expenditures and investments. The costs involved in searching new alternative resources together with the greater health expenditures constitute the opportunity costs of negative environmental impact. Such opportunity costs are very high and require voluminous financial commitments by the government. Therefore, the opportunity costs of negative environmental impact are high.

#### Question 9:

Outline the steps involved in attaining sustainable development in India.

**Answer:**

Sustainable development refers to the achievement of economic development by careful and judicious utilisation of the natural resources so that the present generations' needs are fulfilled without compromising that of the future generations'. It becomes our moral responsibility to hand over earth in good order to the future generation. Aligned with the view of a leading environmental economist, Herman Daly, India has taken the following steps to achieve the aim of sustainable development:

**i. *Population Control Measures***

India has promoted various measures to arrest population explosion. The various population control measures include spread of awareness and knowledge of birth control measures and literacy.

**ii. *Use of Environment Supportive Fuel***

As the fuels such as petrol and diesel emit huge amount of carbon dioxide that leads to global warming, so, the Indian government has promoted the use of CNG and LPG. These are clean, eco-friendly fuels that emit lesser smoke.

**iii. *Use of Solar and Wind Energy***

India being a moderate country is enriched with sunlight and wind power. These are two free gifts of nature that is non-exhaustible. It solves the problem of economic growth with due focus on sustainable development.

**iv. *Recycling and Ban on Plastic Bags***

The industrial and household wastes are accumulated on daily basis. There is a need to develop the habit of recycling of waste products in order to sustain the environment. Household waste can be used as manure for organic farming. A very recent step taken by the Indian government is banning the use of plastic bags. This is a very good step as plastic bags do not get decomposed easily and leads to pollution while recycling.

**v. *Pollution Tax and Fines***

Indian government has taken many steps to control pollution. Some of the measures are regular vehicle checkups, levying pollution tax on the industries emitting smoke. These measures are coupled with huge fines and even imprisonment for the law breakers.

**vi. *Use of the Input Efficient Technology***

The input efficient methods have been devised that not only increases the production and productivity but also efficiency with which the inputs are used. The efficient use of input, on one hand, leads to lesser exploitation of the natural resources and, on the other hand, enhances the future economic growth prospects of India.

**Question 10:**

India has abundant natural resources - substantiate the statement.

**Answer:**

India is fortunate enough to have abundant natural resources. It comprises of rich and fertile soil, plenty of rivers and tributaries, green forests, mineral deposits, mountains, etc. The Indo-Gangetic plains are the most fertile, densely populated and cultivated plains in the world. It stretches from the Arabian Sea to the Bay of Bengal. The black soil of the Deccan Plateau is suitable for the cultivation of cotton in the country. India's lush green forests serve as a natural cover for the majority of the population. India holds more than 20 % of the world's total iron ore reserves. There are mountain ranges that facilitate the operation of the mini hydel plants. It also has vast variety of flora of 15,000 species of plants. The country is also endowed with numerous minerals that are found under the earth's surface like coal, natural gas, copper, diamonds, etc.

#### Question 11:

Is environmental crisis a recent phenomenon? If so, why?

#### Answer:

Yes, the environmental crisis is a very recent phenomenon; the sparks of such crisis were never visible in the past. In the early centuries before industrialisation, the population growth was on a tight rein. The demand of the environmental resources was much lower than its supply. Environment supported the world's population in the past as the rate of usage of the resources was lesser. Also, the rate of regeneration of resources exceeded the rate with which the resources were exploited. In other words, the threat of environment crisis was never felt in the past as the exploitation of natural resources was within the carrying capacity of the environment. But, today, due to heavy industrialisation, urbanisation, man has started exploiting nature to its maximum. Nuclear and industrial wastes being dumped into the water bodies, pollution of land and air has affected the environment in three-fold manner. Now, the rate of exploitation of natural resources is lagging behind the rate of regeneration of the natural resources. Consequently, the mounting pressure on the carrying capacity of the environment is paving the way for environmental crises.

#### Question 12:

Give two instances of

(a) Overuse of environmental resources

(b) Misuse of environmental resources.

#### Answer:

(a) Overuse of environmental resources

i. **Drying up of Rivers:** The increasing irrigation and construction of flood storage reservoirs are resulting in the drying up of rivers.

ii. **Excessive Deforestation:** The growing population and their ever growing demand are resulting in large scale deforestation. This leads to soil erosion, making the soil infertile.

(b) Misuse of environmental resources.

i. **Use of Rivers to Discharge the Waste:** Water is essential for life. The misuse of water as a resource is responsible for its pollution and contamination. The factors responsible for water pollution

are the discharge of domestic sewerage, industrial waste, and thermal power plants into the rivers.

**ii. Use of Wood for Cooking Food:** Wood is a non-renewable source of energy. It is obtained from trees. Using wood instead of eco friendly alternative fuels for cooking purposes brings about deforestation.

### **Question 13:**

State any four pressing environmental concerns of India. Correction for environmental damages involves opportunity costs. Explain.

### **Answer:**

Air pollution, water contamination, soil erosion, deforestation and wild life extinction are some of the most pressing environmental concerns for India. But the priority issues include global warming, land degradation, ozone depletion and management of fresh water.

Opportunity cost is the cost that is foregone when we make a choice or a decision. If a piece of land is to be used for wheat production then the production of say, rice, is to be sacrificed. The loss of rice production is the opportunity cost of producing wheat. In the similar way, the opportunity cost of correction for environmental damages refers to the huge amount of expenditure incurred on searching for new efficient alternatives. The heavy intensive and extensive extraction of both renewable and non-renewable resources demands expenditure for exploring new alternative resources in order to avoid an environmental crisis. The discovery of such resources requires heavy investment by the government. Also, implementation and maintenance of these alternative resources involve very high cost. The best example is the advent of CNG in order to reduce the rising problem of pollution in Delhi. The government has incurred heavy investment to popularise CNG and to make the consumers aware regarding its uses. Therefore, the correction for environmental damages involves opportunity cost that is very high.

### **Question 14:**

Explain the supply-demand reversal of environmental resources.

### **Answer:**

From the very inception of civilisation till the advent of industrialisation, the rate of extraction of the natural resources was far behind the rate of their regeneration. That is, in other words, the demand for resources falls short of the supply of the resources. The exploitation of nature by man was within the absorptive capacity of the environment. But, in today's scenario with population explosion and industrial revolution, the demand for resources for both production and distribution has risen at a much more rapid rate. However, the rate of regeneration of these resources is relatively much lower than the rate of their extraction. In other words, the rate of consumption (demand) of the natural resources exceeds that of their supply. This is beyond the absorptive capacity of the environment and has made environmental crisis more probable. This reversal in the demand and supply relationship is referred to as the supply-demand reversal of the environmental resources.

### **Question 15:**

Account for the current environmental crisis.



## Answer:

The population explosion and affluent consumption have placed an undue and excess burden on the environment. The resources are increasingly exhausted day by day, but the regeneration of resources is constant. So, when the resources are extracted at a rapid pace than its regeneration, then the carrying capacity of the environment reduces. Then environment fails to perform its function of sustaining life, consequently, resulting in an environmental crisis. The current environmental crises include two major global issues, namely, global warming and ozone depletion. Global warming is the result of rising temperature globally due to the emission of green house gases, especially, carbon dioxide. The rise in temperature accelerates the melting of polar ice leading to the rise of water level in the sea. This leads to ecological imbalances. Ozone depletion is another major concern that is caused due to the excessive use of chlorofluorocarbon (CFCs) in the air conditioners and refrigerators. As ozone depletes, the possibility of ultra violet radiations penetrating into earth surface increases, posing a threat to the living organisms. The culminated effect of these two accounts for major concern of environmental crisis in the present time.

## Question 16:

Highlight any two serious adverse environmental consequences of development in India. India's environmental problems pose a dichotomy-they are poverty induced and, at the same time, due to affluence in living standards. Is this true?

## Answer:

The two serious issues or consequences of development in India are land degradation and biodiversity loss. The developmental activities in India exerted tremendous pressure on the natural resources and also affected human health and well being.

**Land Degradation:** The gradual but consistent loss of fertility of land is referred to as degradation of land. This is emerging as a serious concern in the context of environmental issues in India. The following are the factors that contribute to land degradation in India:

**a. Soil Erosion:** The removal of upper layer of the soil caused either by the strong winds or floods is termed as soil erosion. This top most layer of the soil carries major nutrients like nitrogen, phosphorous and potassium that are essential for the growth of plants. Therefore, the loss of this layer reduces the productivity of the land.

**b. Alkalinity and Salinity of Soil:** The salinity and alkalinity is caused by the problem of water logging. The water logged on the top layer of soil absorbs all the nutrients present in the soil leading to the deterioration of fertility of land.

**c. Deforestation:** The growing population and their ever growing demand leads to a large scale destruction of forest cover. The removal of forest cover affects the ecological balance by reducing the level of oxygen in the air. This leads to increase in the pollutants that cause various health hazards.

**d. Shifting Cultivation:** The practice of shifting cultivation along with the subsistence farming carried by small and marginal farmers resulted in the replenishment of soil nutrients and fertility.

The environmental problems points to the paradoxical situation in the country. Deforestation in India is a rapid consequence of population explosion and widespread poverty. The poor people in the rural areas are compelled to fell trees for earning their livelihood. The growing demand for natural

resources to carry out production activity in the urban areas is also equally responsible for the present environmental degradation. There are two different opinions on the effect of environmental activities. One opinion advocates for India's prosperity by resorting to industrial production, while, the other opinion highlights the threat of pollution due to rapidly growing industrial sector. This can be understood as in the wake of rapid urbanisation, the expansion of vehicular traffic generates pollution of noise and air.

#### **Question 17:**

What is sustainable development?

#### **Answer:**

Meeting the basic needs of all that requires distribution of resources is our moral responsibility. It becomes a moral obligation to hand over the earth to the future generation in good order. But, it is realised that if the resources (non renewable) are utilised fully then these will deplete so fast that it will not meet the production capacity of the future generation. The economic development achieved today in such manner cannot be sustained for a long time as the production capacity of the future generations in absence of productive resources reduces. Therefore, sustainable development is the process of economic development that aims at meeting the needs of the present generation without comprising the needs of the future generations. Sustainable development maximises welfare of both present and future generations. In other words, it is that process of economic growth that is sustained over a long period of time without causing any fall in quality of life of the future generations.

#### **Question 18:**

Keeping in view your locality, describe any four strategies of sustainable development.

#### **Answer:**

Sustainable development means a judicious or optimum utilisation of resources in such a manner that the pace of economic growth sustains with inter-generational equity.

The following are the four strategies of attaining sustainable development:

##### **1. *Use of Environment Friendly Fuel***

The growing use of fuel such as petrol and diesel emits huge amount of carbon dioxide that adds to the Green House impact. In order to control pollution, the use of CNG and LPG should be promoted. These fuels are cleaner fuels, smokeless and eco-friendly.

##### **2. *Use of Renewable Resources***

India is well enriched with sunlight, water and wind energy. These are the free gift of nature that are non-exhaustible and pollution free. Thus, attempts should be made to harness solar and wind energy by employing different technologies. It not only solves the problem of economic growth but also the problem of sustainable economic development.

##### **3. *Recycling***

The industrial and household wastes should be accumulated on daily basis. These wastes should be distinguished as bio-degradable and non-biodegradable wastes. The bio-degradable wastes are those wastes that can be decomposed and can be used as manure for organic farming. The non-biodegradable wastes like plastic, etc. can be recycled and re-used.

#### ***4. Use of the Input Efficient Technology***

The input efficient methods and techniques should be devised so that more production is possible at per unit of input. This efficient utilisation of the natural resources leads to lesser exploitation of the natural resources.

#### **Question 19:**

Explain the relevance of intergenerational equity in the definition of sustainable development.

#### **Answer:**

Meeting the basic needs of all that requires the distribution of resources is our moral obligation. It becomes obligatory to hand over the earth to the future generation in a good order. But, it is realised that if the resources (non renewable) are utilised fully, then these will deplete so fast that it will reduce the production capacity of the future generations. The economic development achieved today in such manner cannot be sustained for a long time as the production capacity of the future generations in absence of productive resources reduces. Therefore, sustainable development is the process of economic development that aims at meeting the needs of the present generation without comprising the needs of the future generations. Sustainable development maximises the welfare of both present and future generations. This development does not mean a check on the existing pace of economic growth. It only means a judicious or optimum utilisation of resources in such a manner that pace of economic growth sustains with inter generational equity.