CHAPTER 9 ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

9.2 ENVIRONMENT – DEFINITION AND FUNCTIONS [NCERT QUESTIONS 1 and 6]

Environment is defined as the total planetary inheritance and the totality of all resources. It includes all biotic and abiotic factors that influence each other.

While all living elements such as birds, plants, animals etc. are biotic elements; abiotic elements include air, water, land etc.

Functions of the environment

The environment performs four vital functions -

(a) It **supplies resources** – both renewable and non-renewable resources.
(b) It **absorbs waste material** generated by humankind.
(c) It **sustains life by providing genetic and bio-diversity** – Environment provides us with various ingredients like sun, soil, water and air that are necessary for survival of life.
(d) Environment provides surroundings such as rivers, oceans, mountains etc. It provides scenic beauty that man admires in life.

The environment is able to perform these functions without any interruptions as long as demand of these functions is within the carrying capacity of environment.

Carrying capacity of environment means that the rate of resource extraction is not above the rate of resource regeneration and the wastes generated are within the absorbing capacity of the environment.

If rate of resource extraction is greater and environment is not able to absorb the waste materials generated then environment will fail to perform its third and most important function of life sustenance and this will result in an environmental crisis.

The rising population of the developing countries and the high production and consumption standards of the developed world have put a huge stress on the environment. Many resources have become extinct and the wastes generated are outside the absorptive capacity of the environment.

Absorptive capacity means the ability of environment to absorb degradation.

Today we are facing environmental crisis. The past development has polluted and dried up rivers and thus making water an economic good i.e. a good for which we pay a price to buy it.

The extraction of both renewable and non-renewable resources has exhausted some of the important resources and thus we are forces to spend huge amounts on technology and research to explore new resources.

Decline in air and water quality have resulted in increase in number of patients suffering from air and water-borne diseases. Thus, the expenditure on health has also increased.

Government has to spend millions in order to correct global environmental issued such as global warming and ozone depletion.

Thus, it is clear that **the opportunity costs of negative environmental impacts are high. [NCERT Question no. 8]**

9.3 STATE OF INDIA'S ENVIRONMENT

[NCERT QUESTION NO. 10 India has abundant natural resources – substantiate the statement]

* India has abundant resources in terms of rich quality of soil, hundreds of rivers, lush green forests, plenty of mineral deposits, vast stretch of the Indian Ocean, ranges of mountains etc.

* The Indo-Gangetic Plains- spread from the Arabian sea to the Bay of Bengal- are one of the most fertile, intensively cultivated and densely populated regions in the world.

* Large deposits of iron-ore, coal and natural gas are found in India. India alone accounts for nearly 20% of the world's total iron-ore reserves.

* The Black soil of the deccan plateau is suitable for the cultivation of cotton in the country. **[Answer of Question No. 10 ends here]**

Air pollution, water contamination, soil erosion, deforestation and wildlife extinction are some of the environmental concerns of India.

Some of the **main environmental concerns identified** are:

(a) Land degradation
(b) Biodiversity loss
(c) Air pollution mainly due to vehicular pollution in urban areas
(d) Solid waste management
(e) Management of fresh water

NCERT QUESTION NO. 7 Identify six factors that are responsible for land degradation in India?

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 contributes to land degradation in India:

(a) 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.

(b) Excessive use of fertilisers- The excessive use of chemical fertilisers, insecticides and pesticides lowers the quality and fertility of soil.

(c) Soil erosion – The removal of upper layer of the soil which carries essential nutrients like nitrogen, phosphorous etc. by strong winds or floods is termed as soil erosion. The loss of this upper layer leads to decrease in quality and productivity of land.

(d) Forest fires and over-grazing

(e) Extraction of ground water in excess of recharge capacity

(f) Improper crop rotation

In India, air pollution is widespread in urban areas where vehicles are the major contributors and in a few other areas which have a high concentration of industries and thermal power plants.

9.4 SUSTAINABLE DEVELOPMENT

The concept of sustainable development was emphasised by the **United Nations Conference on Environment and Development [UNCED] in their seminal report named – Our Common Future.**

According to UNCED, Sustainable development is development that meets the need of the present generation without compromising the ability of the future generation to meet their own needs.

According to **Herman Daly** "**to achieve sustainable development, the following needs to be done":**

(a) Limiting the human population to a level which is within the carrying capacity of the environment.
(b) Technological progress should be input efficient and not input consuming
(c) Renewable resources should be extracted on a sustainable basis i.e. rate of extraction should not exceed the rate of regeneration.
(d) Inefficiencies arising from the pollution should be corrected.

STRATEGIES FOR SUSTAINABLE DEVELOPMENT

(A) USE OF NON-CONVENTIONAL SOURCES OF ENERGY

- India is hugely dependent on thermal and hydro power plants to meet its power needs. Both of these have adverse environmental impact.
- We should focus on using renewable sources of energy such as wind energy, solar energy etc. which are cleaner and greener and which will meet our energy needs on a large scale without harming the environment.

(B) LPG, GOBAR GAS IN RURAL AREAS

- Households in rural areas generally use wood or cow dung as fuel. This practise has adverse effects like deforestation, air pollution etc.
- To rectify this situation, government provides subsidised LPG and Gobar Gas Plants through easy loans and subsidies.

(C) CNG IN URBAN AREAS

- In many cities' government is encouraging the sale and usage of vehicles which run CNG (Compressed Natural GAS) In order to correct the problem of air pollution.

(D) SOLAR POWER THROUGH PHOTOVOLTAIC CELLS

- With the help of photovoltaic cells, solar energy can be converted into electricity. These cells use special kind of materials to capture solar energy and then convert the energy into electricity.

(E) Mini-Hydel Plants

- Mini-hydel plants use the energy of streams found in mountainous regions to move small turbines. The turbines generate electricity which can be used locally.
- Such power plants are environment friendly as they do not change the land use pattern in areas in which they are located.

(F) Biopest Control

- With green revolution, states started using more and more of chemical pesticides for higher yield. Adverse impacts started showing in food products which were contaminated.
- Efforts are made to have safer methods of pest control. Neem based pesticides are environment friendly and free from side effects.
- Various animals and birds like owl, peacock, snakes, lizards etc. are also helps in controlling pests.

(G)BIOCOMPOSTING

- The use of chemical fertilizers has resulted in large areas of unproductive land, chemical contamination of water bodies including ground water system.
- Farmers have again started using compost made from organic waste of different types. In certain parts of the country, cattle are maintained only because they produce dung which is an important fertiliser and soil conditioner.
- Earthworm can convert organic matter into compost faster than normal composting process.

NCERT QUESTIONS

1. **What is meant by environment?**

Ans. Refer Notes

2. **What happens when the rate of resource extraction exceeds the rate of their regeneration?**

Ans. If rate of resource extraction is greater and environment is not able to absorb the waste materials generated then environment will fail to perform its third and most important function of life sustenance and this will result in an environmental crisis.

3. **Two major environmental issues facing the world today are …… and ……..**

Ans. Global warming and Ozone Depletion

Global warming refers to the phenomenon of continuous increase in global temperature due to pollution and deforestation. It is caused by emission of green house gas, particularly, carbon dioxide.

Ozone acts as a cover for the earth surface from the harmful ultra-violet radiations from penetrating the earth surface. But its depletion due to excessive use of cooling substances in the air conditioners and the refrigerators is becoming a global concern these days.

6. **Explain how opportunity costs of negative environmental impact are high.**

Ans. Refer Notes

7. **Outline the steps involved in attaining sustainable development in India.**

Ans. **(a) <u>Use of CNG and LPG</u>** – As the fuel 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.

(a) <u>Use of Solar and Wind Energy</u> – India being a moderate country is enriched with sunlight and wind power. These are free gifts of nature that is non-exhaustible. It solves the problem of economic growth with due focus on sustainable development.

(b) <u>Une of input efficient technology</u> – The input efficient methods have been developed that not only increases the production and productivity but also efficiency with which the inputs are used.

The efficient use of inputs leads to lesser exploitation of the natural resources and it also enhances the future economic growth prospects of India.

(c) <u>Recycling and ban on plastic bags</u> – there is a need to develop habit of recycling of waste products in order to sustain the environment.

Household wastes 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.

(d) <u>Pollution tax and fines</u> – Indian government has taken many steps to control pollution. Some of the measures are regular vehicle check ups, levying pollution tax on industries emitting smoke.

These measures are coupled with huge fines and even imprisonment for the law breakers.

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

Ans. Yes, the environmental crisis is a very recent phenomenon. In the early centuries before industrialisation, the population growth was limited. 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 exceeded the rate at which resources were exploited.

But, today, due to heavy industrialisation, urbanisation, man has started exploiting nature to its maximum. Nuclear and industrial wastes are being dumped into water bodies, pollution of land and air has affected the environment. Now, resources are exploited at a very fast pace and it has led to extinction of many resources.

9. Give two instances of:

(a) Overuse of environmental resources
(b) Misuse of environmental resources

Ans. (a) Overuse of environmental resources

- **Excessive deforestation** – The growing population and their ever-growing demand are resulting in large scale deforestation.
- **Drying up of rivers** – The increasing irrigation and construction of flood storage reservoirs are resulting in the drying up of rivers.

Misuse of environmental resources

- **Use of rivers to discharge the waste** – The factors responsible for water pollution are the discharge of domestic waste, industrial waste and thermal waste into the rivers.
- **Use of wood for cooking** – Using wood for cooking purpose has led to massive deforestation and air pollution.

10.(a) State any four pressing environmental concerns of India.

(b) Correction of environmental damages involves opportunity costs – explain.

Ans. Four pressing environmental concerns of India are:

(a) Global warming – Global warming refers to the phenomenon of continuous increase in global temperature due to pollution and deforestation. It is caused by emission of greenhouse gas, particularly, carbon dioxide.

(b) Ozone depletion- Ozone acts as a cover for the earth surface from the harmful ultra-violet radiations from penetrating the earth surface. But its depletion due to excessive use of cooling substances in the air conditioners and the refrigerators is becoming a global concern these days.

(c) Air pollution –

(d) Water Crisis-

Opportunity cost of correction for environmental damages refers to huge amount of expenditure incurred on searching for new efficient alternatives. Due to heavy extraction of both renewable and non-renewable resources, we have to spend huge sum on exploring alternatives if we want to avoid a crisis like situation in future.

Example – The government has incurred heavy investment to popularise CNG and to make the consumers aware regarding its uses.

14. Explain the supply-demand reversal of environmental resources.

Ans. From the very beginning of civilisation till the advent of industrialisation, the rate of extraction of the natural resources was very less as compared to the rate of their regeneration. In other words, the demand for resources was less than their supply. 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. Today demand for these resources exceeds their supply i.e. rate of their regeneration is less than their rate of their extraction. Thus it has now gone beyond the absorptive capacity of environment.

This reversal in the demand and supply relationship is referred to as the supply-demand reversal of the environmental resources.

15. Account for current environmental crisis.

Ans. The rising population of the developing countries and the high production and consumption standards of the developed world have put a huge stress on the environment. Many resources have become extinct and the wastes generated are outside the absorptive capacity of the environment.

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The extraction of both renewable and non-renewable resources has exhausted some of the important resources and thus we are forces to spend huge amounts on technology and research to explore new resources.

Decline in air and water quality have resulted in increase in number of patients suffering from air and water-borne diseases. Thus, the expenditure on health has also increased.

Government has to spend millions in order to correct global environmental issued such as global warming and ozone depletion.

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

Ans. Sustainable development is the process of economic development that aims at meeting the needs of the present generation without compromising on the needs of the future generation.

The following are the four strategies of attaining sustainable development:

(a) **Use of CNG and LPG** – As the fuel 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.

(b) **Use of Solar and Wind Energy** – India being a moderate country is enriched with sunlight and wind power. These are free gifts of nature that is non-exhaustible. It solves the problem of economic growth with due focus on sustainable development.

(c) **Une of input efficient technology** – The input efficient methods have been developed that not only increases the production and productivity but also efficiency with which the inputs are used.

The efficient use of inputs leads to lesser exploitation of the natural resources and it also enhances the future economic growth prospects of India.

(d) **Recycling and ban on plastic bags** – There is a need to develop habit of recycling of waste products in order to sustain the environment.

Household wastes 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.

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

Ans. According to the UNCED sustainable development is, "Development that meets the needs of present generation without compromising the ability of the future generation to meet their own needs."

Thus, it is the moral obligation of the present generation to hand over planet earth in good order to the future generation, no less than what we have inherited.

16. (a) Highlight any two serious adverse environmental consequences of development in India.

(b) 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?

Ans. (b) The developmental activities in India have caused a pressure on its finite Natural resources, besides creating harmful effect on human health and well-being.
Air pollution. Water contamination, deforestation, soil erosion are some of the environmental concerns of India.