

ECONOMICS

(Indian Economic Development)

Chapter 9: Environment Sustainable Development



ENVIRONMENT SUSTAINABLE DEVELOPMENT

Environment Sustainable Development:

Environment Sustainable Development refers to a situation in which an individual is unable to fulfill the basic necessities of life. In other words, it is the ability of a individual to fulfill the minimum requirement of life like food, clothing, shelter, education and health facilities etc.

Environment:

Refers to the total planetary inheritance and the totality of all the resources. In other words, Environment includes all the biotic (living elements) and abiotic (non-living element) elements which influence each other.

Biotic elements – Living beings – bird, plants, humans etc **Abiotic elements – non-living elements – air, water, land etc.**

Functions of environment:

- **Supplies resources:** Environment provides various resources such as wood, minerals, soil etc. These resources are necessary for the process of production and they are available at free of cost in the environment.
- **Environment assimilates waste:** Environment absorbs various waste generated in the process of production by human beings. Assimilation of the waste is necessary for the survival of life on planet earth.
- **Sustains life:** It includes various ingredients which are necessary for the survival of human life. This ingredient includes sun, water, soil and air.
- **Enhance the quality of life:** Environment includes land, forests, mountains, rivers etc. Man enjoys these surroundings and the scenic beauty of these elements. Such elements help in improving the quality of life.

Carrying capacity of environment:

It refers to the capacity of environment under which it is able to perform the above functions without any interruption.

The environment is able to perform the functions till the demand for its resources lies under the carrying capacity.

In other words, carrying capacity implies that resources extraction should not go above the rate of resource generation and the generation of wastes should remain within the absorption capacity of the environment.

Absorption capacity of environment: It refers to the ability of the environment to absorb

degradation (waste).

Environment crises:

Increase in population and urbanization leads to heavy stress on environment. Due to the various resources has already becomes extinct while others are reducing day by day.

Some of the reasons of environment crises are as follows:

- **Increase in population:**One of the most important reasons of environment crises is the increase in population of humans. Increased population demand for an extra unit of resources which creates more amount of pressure on the environment.
- **Industrial revolution:**Increase in the amount of industries increases the amount of consumption of natural resources as raw material and also increases the amount of waste from these industries which ultimately result in environment crises.
- **Extraction of resources:**Extensive and intensive extraction of both renewable and non-renewable resources decreases the natural reserves of environmental resources due to which some vital resources are at the point of extinction.
- **Affluent consumption:**It refers to the spending of money on the acquiring of luxury goods and services to publicly display economic power of the income.Increase in the trend of affluent consumption of developed countries increases the amount of consumption which leads to a greater demand of resources.

Pollution

It refers to adding a substance in the environment which has harmful or poisonous effect.In other words, pollution refers to the introduction of harmful substance in air, water and land.

Basically pollution is of 4 types:

- **Air pollution:**Caused by Burning of fossil fuels, smoke of vehicles, smoke by industries etc.
- **Water pollution:**Caused by Dumping of chemical wastes of factories in rivers, Sewerage that flows from rivers, throwing of plastics in ocean etc.
- **Noise pollution:**Caused by sound of vehicles, aircraft noise, industrial noise, high volume equipment's etc.
- **Land pollution:**Caused by Deforestation, Urbanization, Industrialization etc.

Global warming:

It refers to the gradual increase in the average temperature of earth atmosphere.

It is caused by the man made increase in the amount of greenhouse gases (CO₂, CFCs, methane etc.) in the atmosphere through the burning of fossil fuels and deforestation.

Effects of global warming:

- Rise in sea level due to melting of polar ice
- Increase in tropical storms
- Many species becomes endangered.
- Increase in the incidence of tropical diseases (like malaria, dengue etc.)

Ozone depletion:

The ozone layer is a region of earth stratosphere (a layer of atmosphere) that absorbs most of the sun ultraviolet radiation. It contains high concentration of ozone in relation to other parts of the atmosphere. It protects the planet from direct contact of ultraviolet rays.

Ozone depletion refers to the destruction of ozone in the ozone layer due to presence of high level of CFCs (Chlorofluocarbons) and bromine compounds in the atmosphere.

CFCs is used as cooling substance in AC and Refrigerators

Effects of ozone depletion:

Depletion of ozone layer allows more ultra violet radiation to come o earth which causes various problems to living organism such as skin cancer, eye cancer and damage of immune system, hampers the growth of other living elements etc.

Challenges of Indian Environment:

- The priority issues of India's environment are as follows:
- Deforestation or Degradation of land
- Land Degradation
- Soil erosion
- Biodiversity loss
- Air pollution
- Management of fresh water

Deforestation or Degradation of land:

It refers to the removal of a forest or stand trees from land which is then converted into non-forest use.

In other words, it refers to cutting, clearing and removal of rainforest where land is thereafter converted to a non-forest use.

One of the main priority issue of environment is deforestation. Industries improves the quality of life by providing variety of goods and services but on other hand it disturbs the whole ecological system, as industrialization leads to urbanization and urbanization requires more amount of land which ultimately leads to deforestation. More and more amount of forest are for the purpose of development of cities and towns.

Chipko Movement/Chipko andolen – hug the tree:

- The Chipko movement (in north) or appiko movement (in south) was a forest conservation movement in India.
- It was begun in 1970.
- In early 1970s, when the felling of trees by the authorities has started in sirsi district, 160 men, women and children hugged the trees. And forced the woodcutters to leave.

Land Degradation:

It refers to the decrease/decline in the productive capacity of the land. In other words, it refers to a decline in the overall quality of soil, water and vegetation condition commonly caused by human activities. Factors responsible for land degradation.

- Deforestation
- Forest fires
- Improper crop rotation
- Indeterminate use of fertilizers and pesticides
- Improper planning and irrigation systems
- Non adoption of adequate soil conservation measures

Soil erosion: It refers to the removal of upper layer of the soil which contains the majority of nutrients which are essential for the growth of plant. Soil erosion is caused by strong winds and floods. Plantation of more trees can stop the process of soil erosion as trees holds the layer of soil and protects them from winds and floods.

Biodiversity loss: Biodiversity refers to the variety of plant and animal life in the world or in a particular habitat. Biodiversity boosts ecosystem productivity wherein each species, whether small or large play an important role. Biodiversity loss refers to the extinction of species (plant or animal) worldwide, and also the local loss of species in a certain habitat.

Sustainable development: The development of our present generation without hampering the development of future generation is known as Sustainable development. The basic motive of sustainable development is to ensure that the present generation should give a quality of life to the next generation, which is not less than what the present generation inherits.

Achieve sustainable development:

In order to achieve sustainable development, following things are to be done

- **Limiting population:**In order to make the consumption of resources under the carrying capacity of the environment, the most important thing that is to be done is the control of growth rate of population.
- **Careful use of renewable resources:**Here, careful use refers to the pace of consumption in which the extraction of resources should not exceeds the regeneration.
- **Substitution of non-renewable resources:**In order to achieve sustainable development, non-renewable resources must be substitute with renewable resources. Moreover, the rate of depletion of non- renewable resources must not exceeds the rate of creation of renewable resources.
- **Pollution control:**Here pollution does not only means air pollution, it includes all type of pollution (such as land, air, water, sound). In order to achieve sustainable development, the discharge of pollution should be limited to the absorption capacity of the environment.
- **Input efficient technology:**There is a need of such production technology which is input efficient and not input consuming i.e., more amount of production in same amount of resources input.

Strategies for sustainable development:

Here is the list of various strategies that can be adopted for sustainable development

- **Use of cleaner fuels:**In place of smoke emitting fuels like coal and petroleum such fuels are to be taken into consideration which does not produce pollution, for example – Liquefied petroleum gas (LPG), Compressed natural gas (CNG), gobargas in rural areas etc.
- **Use of non-conventional sources of energy:**The sources of energy which comes into existence in the recent past are known as non-conventional sources of energy.In other words, it refers to the sources of energy which has been discovered just because of modern technology (used just from past few years)For example – winds power, solar energy etc.Use of such energy is beneficial for environment as well as for human beings as these sources of energy are termed as green sources i.e., they does to pollute environment and can also be treated as the substitute of conventional sources of energy.
- **Public means of transport:** In order to reduce the consumption of petrol and to decrease the amount of air pollution public transport must be taken into consideration. As it reduces the amount of traffic and consumption of petrol which reduces sound and air pollution.For example – metro in Delhi
- **Traditional knowledge and practice:** India is considered to be a environment friendly country. From ancient period, the people of India are very close to the

environment, our agriculture system, transport, household have been environment friendly. While shifting from our tradition system to the western system we ignore the pride and environment friendly culture of our country. There is a need to develop Indian culture in the heart of Indian public. Example – AYUSH (Ayurvedic, Yoga and Naturopathy, Unani, Siddha and Homeopathy) treatment in India.

- **Organic farming:** It is a process of producing food naturally; under such farming the use of chemical fertilizers and high yielding variety of seeds is totally prohibited. Increase in the trend of organic farming reduces the use of chemical fertilizers and pesticides which ultimately reduces the land degradation. Moreover, agriculture through natural process increases the quality of food.
- **Management of waste:** In order to control water pollution, proper management of industrial and household waste must be done. This waste should not enter into river and shall be systematically managed. Wastage of household can be recycled into compost and used as manure for organic farming.
- **Mini-hydel plants:** It refers to the plants which are used to generate electricity through the power of flowing water. There are plenty of small rivers and streams in mountain regions, hydro powerplants must be installed in those areas through which electricity can be generated. Moreover, these plants are environment friendly and are capable of meeting local demands.

Summary:

- Biotic elements – Living beings – bird, plants and humans etc.
- Abiotic elements – non-living elements – air, water, land etc.
- Functions of environment
- Supplies resources
- Environment assimilates waste
- Sustains life
- Enhance the quality of life
- Carrying capacity of environment
- Absorption capacity of environment
- Environment crises
- Increase in population
- Industrial revolution
- Extraction of resources
- Affluent consumption
- Pollution
- Global warming
- Effects of global warming
- Ozone depletion

- Effects of ozone depletion
- Challenges of Indian Environment
- Deforestation or Degradation of land
- Land degradation
- Soil erosion
- Biodiversity loss
- Air pollution
- Management of fresh water
- Sustainable development
- Strategies for sustainable development

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Strategies

- Use of eco-friendly sources of energy e.g., gobar gas
- Solar power through photovoltaic cells
- Organic farming
- Bio composing
- Bio-peat control
- Stringent laws on the disposal of chemical effluents

Meaning

Pattern of use of resources that aims to meet the basic needs of not only the present generation but also of the future generations.

Sustainable Development

Environment And Sustainable Development

Environment Degradation

Causes

- Population explosion • Poverty
- Agricultural development
- Industrialization
- Urbanization
- Transport development
- Disregard to civic norms

Effects

- Global warming
- Depletion of ozone layer
- Air and water pollution
- Deforestation
- Land degradation
- Rise in opportunity cost of negative environmental impacts

Important Questions

Multiple Choice questions-

Q1. The government set up the Central Pollution Control Board to control

- (a) noise pollution
- (b) air pollution
- (c) deforestation
- (d) land pollution

Q2. Sustainable development can be achieved by

- (a) controlling pollution
- (b) controlling the growth of population
- (c) restricting use of renewable resources
- (d) all of these

Q3. Which of the following is an impact of global warming?

- (a) Deforestation
- (b) Rise in sea level
- (c) Waste generation
- (d) Rapid increase in population

Q4. In which of the following layers of the atmosphere is ozone shield found?

- (a) Troposphere
- (b) Exosphere
- (c) Stratosphere
- (d) Mesosphere

Q5. Which of the following is a consequence of ozone layer depletion?

- (a) Skin cancer in humans
- (b) Lower production of phytoplankton
- (c) Hampers growth of terrestrial plants
- (d) All of these

Q6. When was the Central Pollution Control Board (CPCB) set up?

- (a) 1964
- (b) 1974
- (c) 1984
- (d) 1994

Q7. How many industrial categories have been identified as significantly polluting by the CPCB?

- (a) 17
- (b) 25
- (c) 27
- (d) 31

Q8. Which of the following is the modern concept of development?

- (a) Economic development
- (b) Economic growth
- (c) Sustainable development
- (d) Human development

Q9. Use of which of the following has resulted in a significant reduction in Delhi's pollution?

- (a) LPG at homes
- (b) Solar cells for electricity
- (c) Thermal power plants
- (d) CNG in public transport

Q10. Which of the following is a conventional source of energy?

- (a) Sun
- (b) Wind
- (c) Dried dung
- (d) Tides

Q11. From the following which is a cleaner and greener energy source:

- (a) Thermal power
- (b) Hydro power
- (c) Wind power
- (d) None of the above

Q12. For sustainable development, environment damage rate environment recovery rate.

- (a) should be greater than the
- (b) should be exponentially greater than the
- (c) should be same as the
- (d) should be lesser than the

Q13. Which of the option is not incorporated as sustainable development parameters?

- (a) Gender disparity and diversity
- (b) Inter and Intra-generation equity
- (c) Carrying capacity
- (d) None of the above

Q14. South Africa is leading exporter of which mineral?

- (a) Copper
- (b) Diamond
- (c) Silver
- (d) Gold

Q15. The first airport powered by solar energy was

- (a) Bangalore
- (b) Cochin
- (c) London
- (d) Frankfurt

Very Short Questions:

Question 1. Give two examples of biotic elements.

Question 2. Name any two greenhouse gases.

Question 3. What causes skin cancer in humans?

Question 4. Name the important mineral reserves in India.

Question 5. List the major contributors to air pollution in urban India.

Question 6. Write two features of sustainable development.

Question 7. How can solar energy be converted into electricity?

Short Questions:

Question 1. Distinguish between renewable and non-renewable resources.

Question 2. State some long-term impacts of global warming.

Question 3. State some long-term impacts of global warming.

Question 4. Write short notes on the following:

- (i) Solar energy
- (ii) Mini-hydel plant

Question 5. How does thermal power plant cause pollution?

Question 6. How do animals help in biopest control?

Long Questions:

Question 1. Define the term 'Global Warming'? What are its main causes?

Question 2. Suggest some measures to prevent environmental degradation.

Question 3. Differentiate between economic development and sustainable development.

Question 4. Explain the objectives of sustainable development.

Case Study Based Question-

1. Read the following hypothetical text and answer the given questions: -

In recent years, awareness of the harmful effect of chemical-based fertilizers and pesticides on our health is on rise. Conventional agriculture relies heavily on chemical fertilizers and toxic pesticides etc which enter the food supply and penetrate the water resources, harm the livestock, deplete the soil and devastate natural eco systems. Efforts in evolving technologies which are eco-friendly, are essential for sustainable development and one such technology which is ecofriendly is organic farming. In short, organic agriculture is a whole system of farming which restores, maintains and enhances the ecological balance. There is an increasing demand for organically grown food to enhance food safety throughout the world.

Questions:

1. In context of sustainable development, which of the following is/ are strategies to achieve it?

- (a) use of sustained methods of farming
- (b) use of bio pest
- (c) use of natural manure
- (d) all the above

2. Green Revolution was a major reason of rise in productivity of farming. What are the advantages of conventional farming methods?

- (a) higher output
- (b) cost effective
- (c) wider range
- (d) all of these

3. _____ is more popular non-farm activity after farming.

4. _____ helps in maintaining ecological balance.

2. Read the following hypothetical text and answer the given questions: -

Sustainable development is one which is directly concerned with increasing the material standards of living of the poor at the grass-root level. This can be quantitatively measured in

terms of increased income, real income, educational services, health care, sanitation, water supply etc. In more specific terms, sustainable development aims at decreasing the absolute poverty of the poor by providing lasting and secure livelihoods that minimise resource depletion, environmental degradation, cultural disruption and social instability.

Questions:

1. The concept of sustainable development is related to:
 - (a) Rural development
 - (b) Growth rate of GDP
 - (c) Human development
 - (d) Environment
2. _____ means the ability of the environment to observe degradation. (Absorptive capacity/ supplies resources)
3. The economic development that we have achieved so far has come at a very heavy price that is environment pollution. (true/ false)
4. What happens when the rate of resource extraction, exceeds that of their regeneration?

Assertion Reason Type Question-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
 - a. Both Assertion and Reason are true and Reason (R) is the correct explanation of Assertion (A)
 - b. Both Assertion and Reason are true and Reason (R) is not the correct explanation of Assertion (A)
 - c. Assertion (A) is True but Reason (R) is False
 - d. Assertion (A) is False but Reason (R) is True

Assertion: Presently, global atmosphere is warming up.

Reason: The depletion of the stratospheric ozone layer has resulted in an increase in ultraviolet radiation reaching the earth.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
 - a. Both Assertion and Reason are true and Reason (R) is the correct explanation of Assertion (A)
 - b. Both Assertion and Reason are true and Reason (R) is not the correct explanation of Assertion (A)
 - c. Assertion (A) is True but Reason (R) is False

d. Assertion (A) is False but Reason (R) is True

Assertion: In India, land suffers from different types of degradation.

Reason: In India, there are appropriate management practices to avoid land degradation.

Answers key

MCQ answers:

1. (b) air pollution
2. (d) all of these
3. (b) Rise in sea level
4. (c) Stratosphere.
5. (d) All of these
6. (b) 1974
7. (a) 17
8. (c) Sustainable development
9. (d) CNG in public transport
10. (c) Dried dung
11. (c) Wind power
12. (d) should be lesser than the
13. (d) None of the above
14. (d) Gold
15. (b) Cochin

Very Short Answers:

1. Examples of biotic elements include air, land, water, etc.
2. Answer: Carbon dioxide and methane are greenhouse gases.
3. Answer: Exposure to ultraviolet (UV) radiation causes skin cancer in humans.
4. Answer: The important mineral reserves in India are bauxite, copper, chromate, diamonds, gold, lead, lignite, manganese, zinc, uranium, etc.
5. Answer: The major contributors to air pollution in urban India are:
 - (i) Vehicles
 - (ii) Industries
 - (iii) Thermal power plants
6. Answer: Features of sustainable development are:
 - (i) It increases real per capita income and quality of life.

(ii) It helps in reducing pollution.

7. Answer: Solar energy can be converted into electricity with the help of photovoltaic cells.

Short Answers:

1. Answer: The following are the points of difference between renewable and non-renewable resources:

Renewable Resources	Non-renewable Resources
1. Renewable resources are those which can be used without the possibility of the resource becoming depleted or exhausted.	1. Non-renewable resources are those which get exhausted with extraction and use.
Examples: Trees, fish, water, etc.	Examples: Petroleum, coal, iron-ore, etc.

2. Answer: Some long-term impacts of global warming are:

- Melting of polar ice
- Rise in sea level
- Frequent coastal flooding and tropical storms
- Disruption of drinking water supplies
- Extinction of species
- Increased incidence of tropical diseases

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- Melting of polar ice
- Rise in sea level
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- Extinction of species
- Increased incidence of tropical diseases

4. Answer:

(i) Solar energy can be converted into electricity with the help of photovoltaic cells. These

cells use semi-conductive materials to capture solar energy and then convert the energy into electricity. It is a pollution-free technology, which is extremely useful for such places where power supply through grid or power lines is either not possible or very costly.

(ii) Mini-hydel plants use the energy of perennial streams to move small turbines. These turbines generate electricity, which can be used locally. Mini-hydel power plants are environment-friendly source of energy generation. Such plants are capable of generating enough power to meet local demands.

5. Answer: Thermal power plant cause pollution in the following ways:

- Emission of large quantities of carbon dioxide, which is a greenhouse gas
- Production of fly ash, which can cause land, air and water pollution, if not used properly

6. Answer: Snakes prey upon rats, mice and various other pests. Similarly, birds such as owls and peacocks prey upon vermin and pests. If these are allowed to dwell around the agricultural areas, they can kill variety of pests, including insects. Lizards also help in reducing the insect population in the soil. It is important to know the value of these animals and save them.

Long Answers:

1. **Answer:** Global warming is a gradual increase in the average temperature of the earth's lower atmosphere as a result of the increase in greenhouse gases since the advent of industrial revolution.

Following are the main causes of global warming:

(i) Buildup of Carbon Dioxide: Increase in the level of carbon dioxide in the atmosphere due to burning of fossil fuels is the most significant human cause of global warming.

(ii) Deforestation: Deforestation means clearing the forest to make the land available for other uses. All living plants store carbon. As forest and grassland are cleared for use, enormous amount of carbon dioxide is released back into the atmosphere.

(iii) Methane's Impact: When we consider the effects of methane within a single decade, it is 100 times as powerful as carbon dioxide as greenhouse gas. Methane's has the potential to have significant impacts on the future of global warming.

(iv) Increased Use of Fertilisers: With the advent of green revolution, the use of chemical fertilisers and machines to produce food has increased significantly. One of the primary components of the green revolution is nitrogen fertilisers, which have 300 times more heat trapping capacity per unit of volume than carbon dioxide. Hence, these contribute towards global warming.

(v) Other Causes: Chlorofluorocarbons (CFCs) and hydro chlorofluorocarbons (HFCs) used in refrigerator are also powerful greenhouse gases. These gases occur in lower concentration in the atmosphere but as they are so comparatively more

potent than carbon dioxide, they contribute to global warming as well.

2. Answer: The following measures are needed to prevent environmental degradation:

(i) Population Control: Rising population is a threat to the country. Therefore, it is absolutely essential to check the rising population if environment is to be protected.

(ii) Proper Implementation of Environment Conservation Acts. In India the Environment Protection Act was passed in 1986. The objective of this Act is to check degradation in the quality of environment. Therefore, this Act should be strictly implemented.

(iii) Social Awareness: Social awareness must be spread among the people to understand the dangerous consequences of pollution. This will ultimately save the environment.

(iv) Afforestation Campaign: Plantation should be done on a large scale for the protection of environment.

(v) Water Management: For the protection of environment, provisions must be made to supply clean drinking water to the people. Also river water should be made clean.

(vi) improvement in Housing: For the protection of environment living places of the people should be made neat and clean. Slums must be replaced by airy and well-lighted dwelling houses.

(vii) Solid Waste Management: Solid waste management in a planned way is very essential in the country. Solid waste should be treated chemically. In this connection, rural garbage must be converted into compost for the protection of environment.

7. Answer: The following are the points of difference between economic and sustainable development:

Economic Development	Sustainable Development
1. Economic development refers to the longterm increase in real per capita income and economic welfare.	In sustainable development, besides the increase in real per capita income, the welfare of the present and future generation is taken into consideration.
2. It does not account for the exploitation of natural capital.	Sustainable development emphasises on rational utilisation of natural resources.
3. It is generally used in the context of undeveloped economies.	It is used for developed, developing as well as underdeveloped economies.

4. It lays special stress on the structural technical and institutional changes in the economy.	It does not lay such stress on the structural, technical and institutional changes in the economy.
5. It does not emphasise on environmental protection.	It gives main emphasis on environmental

8. Answer: The objectives of sustainable development are:

(i) Sustained Rise in Real per Capita Income and Quality of Life: The main objective of the sustained development is to maintain the remarkable level of real per capita income and the quality of life.

(ii) Reduction in Pollution: Sustainable development aims to discard those activities which prove to be detrimental to the natural resources and environment. Thus, reduction in the pollution at any cost is its main objective.

(iii) Rational Use of Natural Resources: Its means that people should avoid excessive or unnecessary exploitation of natural resources.

(iv) Fulfilling the Requirements of Future Generation: Sustainable development aims to minimise environmental problems and meet the needs of the present, generation without compromising the ability of the future generation to meet their own needs.

Case Study Answer-

1. Answer:

1. d) all the above
2. d) all of these
3. Pisciculture
4. Organic food.

2. Answer:

1. d) Environment
2. Absorptive capacity
3. true
4. The environment fails to perform its third and vital function of life substance and this results in an environmental crisis. This is the situation today all over the world.

Assertion Reason Answer-

1. b) Both Assertion and Reason are true and Reason (R) is not the correct

explanation of Assertion (A)

2. c) Assertion (A) is True but Reason (R) is False