

LET US KNOW

Green house effect means Progressive warming -up of the Earth's surface due to covering up the man made carbon dioxide (CO_2) in the atmosphere. Thus it is natural process that warms the Earth's surface. In simple word, it is a process that occurs when gases in Earth's atmosphere trap the Sun's heat.



CHECK YOUR PROGRESS

Q 7: What are the Green house gases?

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8.4.1 Impact of Greenhouse Effect

Till this, we have discussed about the meaning of green house effect and its process. But, it is important for you to know its impact on human life or the planet. The most significant greenhouse gas is carbon dioxide which is released to the atmosphere by burning of fossil fuels for different purposes in various ways like burning of woods etc. It is a natural constitute of the Earth's atmosphere. But its increase concentration in the atmosphere leaves adverse affect on biological communities through changes in the thermal condition and global radiation and heat balance and change in the climate condition at local, regional and global levels. Other minor greenhouse gases like CFC_s, halons are released to the atmosphere during the operation and maintenance of appliances and equipments using CFC_s as coolants and propellants like-AC, Refrigerator, cosmetic good, plastic foam etc. These has adverse affect on the planet-

- Due to greenhouse effect, there may occur more hurricanes and cyclones and early snow melt in mountains causing more floods during monsoon.

- It increases the global mean temperature.
- There would be rise in the sea level and cause flooding of coastal areas of lowland countries.
- Increase temperature due to increased greenhouse effect would cause decrease in precipitation and soil moisture content in the agricultural region of the world.
- The increased surface temperature would cause melting of continental and mountain glaciers ice caps.
- The impact of greenhouse effect mainly Carbon dioxide is also expected to deplete the ozone layer

Greenhouse effect is essential for our survival in earth. But increase concentration of the greenhouse gases like carbon dioxide or CO_2 has adverse affect on the planet that we have discussed above. The Earth is ours, we belong to it. Therefore, it is our duty to take remedial measures for checking the increase concentration of CO_2 in the atmosphere affecting the planet.

Remedial Measures

To reduce the concentration of carbon dioxide in the atmosphere, to check the increased global temperature, we all should take some remedial to reduce the release of additional carbon dioxide-

- There should be drastic cut in the consumption of fossil fuel especially in the industrialized countries.
- There should be attempt by the scientist to develop alternative sources of energy and power as fossil fuel consumption is used mostly as a source of energy.
- Some natural and home made efforts through the use of Sunlight can be made to for energy instead of fossil fuel.
- Afforestation and reforestation should be a motto for all by planting more and more plants.

These remedial will certainly help in reduction of additional release of Carbon dioxide, hence it will help to maintain a equilibrium in the atmosphere.



ACTIVITY

Do you have any experience of natural production of Solar Energy? If yes explain about it and how it will help to reduce release of additional Carbon dioxide?

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8.5 MEANING OF ACID RAIN AND ITS EFFECT

Besides ozone depletion and green house effect, there is another important issue to be discussed here is Acid Rain. In your school days, during the Social science classes, you might have heard this type of Rain. We all know about rain, but what is Acid Rain? As the term includes the word Acid, hence it can be termed as an environmental global problem. The acid rain is the rain, where there is more acid than water. It is a kind of rain that is usually acidic. The term, Acid Rain was first used by Robert Young in 1872.

The components of Acid rain are Sulfuric or Nitric acid that fall to the ground from the atmosphere in wet or dry form. This includes rain, snow, fog, hail or even dust in acidic form.



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8.5.1 Causes of Acid Rain

You have come to know about the basic meaning of acid rain. But the process or the way how it is formed, will give you clear meaning of it. As it is mentioned that the main components of acid rain are- Sulfur dioxide (SO_2) and Nitrogen oxides (NO_x). These two

oxides are considered as important gaseous pollutants of the air. These gases are produced by consumption of fossil fuel, smelters, power plants, automobile exhausts, domestic fire etc. Thus we can say that these are man- made pollutants. These Oxides are emitted into the atmosphere are transported by wind and air current. Then, these SO_2 and NO_x are reacted with water, oxygen and other chemicals to form sulfuric and nitric acids. These acids are mixed with water and other material before falling to the ground as acid rain or they may remain in clouds and fogs.

8.5.2 Types of Acid Rain

There are mainly two forms or types of acid rain.

- ***Dry Acid rain or disposition***

  When the particles of sulphate and nitrates are deposited on the earth surface, it is known as dry acid or dry disposition.

- ***Wet Acid Rain or Disposition***

  When the sulphuric, nitric and hydrochloric acids are mixed with atmospheric water vapours and makes rain water more acidic, then it is called wet acid rain.

The amount of acidity in the atmosphere that deposits to earth through dry deposition depends on the amount of rainfall an area receives. Forexample, in desert are the ration of dry to wet acid rain is higher than area that receives several inches of rain each year.



CHECK YOUR PROGRESS

Q 8: Where the Acid rain takes place?

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8.5.3 Factors of Acid Rain

Besides getting the concept, process and types of acid rain,

it is also important for you to know the factor what causes of acid rain. The main cause or factor of acid rain is the emission of SO_2 and NO_x. The longer stay of these oxides in atmosphere causes the formation of acid from oxidized. The following are the major sources of Sulphuric and Nitric acid, the two major components of Acid Rain-

- Burning of fossil fuel to generate electricity and power generators
- Vehicles and heavy equipments.
- Manufacturing or oil refineries and other industries

Thus, we can say that acidification is mainly man-made. Therefore, we should take preventive measures to check the emission of these acids.

8.5.4 Impacts of Acid Rain

Acid Rain is an environmental threat. It has adverse affects on both biotic and abiotic aspects of environment. Let's try to know how it affects the environment-

- The acid rain causes acidification of lakes, sea and thus causes harms to aquatic life.
- It harms the plants, crops and the productivity.
- It increases the level of metals like aluminum, zinc, copper, lead in water beyond the safe limits.
- It decreases the fish population.
- It is also harmful for the ecological balance as many bacteria and blue green algae are killed due to acidification.
- It also affects the building materials such as sand, stone and marbles and creates small holes in the walls.
- Acid rain mixed with water causes diseases like-indigestion, respiratory system.

Thus, it is clear from the above discussion that acid rain is a global environmental problem. It not only harms the human living but also the plants and other living as well as non-living organism.



8.6 LET US SUM UP

- Atmospheric environment is the multi-layered gaseous envelope that surrounds the earth and protect it from the ultra violet solar radiation.
- **Ozone** is also known as trioxygen. It is an inorganic molecule.
- The formula of ozone is O_3. It is the combination of atmospheric oxygen (O_2) and individual oxygen molecule (O), thus results in the **Ozone (O_2 +O ->O_3)**.
- This zone or layer (12 km to 35km above Earth) of ozone is called Ozone Layer.
- It prevents the ultraviolet solar radiation from reaching the Earth's surface by absorbing 97-99percent of the Sun's medium frequency ultra-violet light.
- Depletion of ozone layer means reduction of the ozone O_3 in the stratosphere. Breaking the ozone (O_3) into O_2 and O results in the depletion or destruction of (O_3).
- It means gradual thinning of Earth's ozone layer in stratosphere through lowering its density.
- The major pollutants or culprits responsible for ozone depletion are- Chlorofluorocarbon (CFC_s), Nitrogen Oxides (NO_x) and Hydrocarbons.
- Numbers of global efforts have been made to check its depletion. Among them, Vienna Conference 1985, Montreal Protocol 1998, Helsinki Conference 1989 etc are important among them.
- Reduction in Ozone increases UV radiation on earth by 2 percent.
- A green house is meant for the plants especially in the cold countries where total isolation at least during winter season is not sufficient enough to support plant growth.
- The glasses of the green house are such that it allows the visible sunlight to enter but prevent the long wave infrared (electromagnetic) rays to go out.

- Green house effect is a process that occurs when gases in Earth's atmosphere trap the Sun's heat. This process makes Earth much warmer that it would be without an atmosphere.
- Greenhouse gases are- Water vapour, Carbon dioxide, methane, nitrogen oxide, ozone and some artificial chemicals such as Chlorofluorocarbons (CFC_s).
- There are some adverse affects of Green house effect also like -It increases the global mean temperature, there would be rise in the sea level and cause flooding of coastal areas of lowland countries, increase temperature due to increased greenhouse effect would cause decrease in precipitation and soil moisture content in the agricultural region of the world.
- We should take remedial to drastic cut in the consumption of fossil fuel especially in the industrialized countries.
- There should be attempt by the scientist to develop alternative sources of energy and power as fossil fuel consumption is used mostly as a source of energy.
- The acid rain is the rain that where there is more acid than water.
- It is kind of rain that is usually acidic. The term, Acid Rain was first used by Robert Young in 1872.
- The components of Acid rain are Sulfuric or Nitric acid.
- There are mainly two forms or types of acid rain -Dry Acid rain and Wet Acid Rain.
- The factors of acid rain are acidification of NO_x and SO_2. This acidification is totally man-made.
- It is also harmful for the ecological balance as many bacteria and blue green algae are killed due to acidification.
- It also affects the building materials such as sand, stone and marbles and creates small holes in the walls.
- Acid rain mixed with water causes diseases like- digestion, respiratory system.



8.7 FURTHER READING

1) Bhattacharya K, Bhattacharya R and Sharma S (2012): Environmental Education, Assam Book Depot.
2) Sharma P.D (1990): Ecology and Environment, Rastogi Publishers, Meerut.
3) Sharma R.A(2010) : Environmental Education, R.Lall Book Depot.
4) Sigh S and Dubey A (1989): Environment Management, Allahbad University.



8.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: It is a layer of Earth's atmosphere lying between **troposphere** and **mesosphere**.

Ans to Q No 2: The ozone layer was discovered in 1913 by the French physicists Charles Fabry and Henri Buisson.

Ans to Q No 3: It filters the solar radiation by absorbing unwanted ultraviolet rays and allow only those waves to reach Earth's surface that are essential for planet earth.

Ans to Q No 4: It prevents the ultraviolet solar radiation from reaching the Earth's surface by absorbing 97-99percent of the Sun's medium frequency ultra-violet light.

Ans to Q No 5: The major pollutants or culprits responsible for ozone depletion are-Chlorofluorocarbon (CFC_s), Nitrogen Oxides (NO_x) and Hydrocarbons. The Ozone depletion is a major environmental issue and the man-made as man are responsible for the creation of all these pollutants. Jet Engines, motor vehicles, nitrogen fertilizer and other industrial activities are responsible for emission of CFC_s and NO_x. They make hole in the ozone and thus deplete it.

Ans to Q No 6: Vienna Conference 1985, Montreal Protocol 1998, Helsinki Conference 1989 etc. are important among them.