

M.Sc. ZOOLOGY

SEMESTER 2

CORE COURSE 5

TOPIC: GREENHOUSE EFFECT

The concept of greenhouse effect was given by Dr. Jean Baptiste Fourier in 1837.

This is a natural phenomenon. Fourier described that greenhouse effect is like a heat blanket which insulate the earth and delays the loss of infrared energy from atmosphere to space and thus keeps the earth warm and habitable.

More than 80% energy of infrared category is absorbed by greenhouse gases.

DEFINITION OF GREENHOUSE EFFECT

It is the phenomena of trapping and re-radiation of the heat by greenhouse gases in the atmosphere.

- Gases which absorb the radiant heat energy are known as greenhouse gases or radiatively important gases.

NET RADIATIVE BALANCE;

Greenhouse gases maintain a temperature suitable for livelihood on earth. The average world temperature is +14 °C. If greenhouse gases would not have been there, this temperature was estimated to drop down by 34 degree centigrade and would have been reached the value upto -20 degree centigrade.

- Any change to the net radiative balance at the top of atmosphere is set to cause radiative forcing of atmosphere.
- Radiative forcing may be positive or negative.

Increase in greenhouse gases disturb the balance between incoming and outgoing radiations by reducing the outgoing radiation thus leading to positive radiative forcing.

This positive radiative forcing enhances greenhouse effect which tends to further warm the lower atmosphere and thus increasing the temperature. So, excessive increase in concentration of greenhouse gases in atmosphere retains the more infrared energy resulting in an enhanced greenhouse effect. **Consequent increase in global temperature due to enhanced greenhouse effect is called as global warming.**

NEGATIVE RADIATIVE FORCING: Caused by cloud, aerosol particles which reflect more sun energy back to space.

Example- large volcanic eruptions, aerosols, dust particles.

This negative radiative forcing lead to decrease in earth's surface and oceanic temperature.

BLACK CARBON: Radiatively active particle. These are the tiny particles resulted due to incomplete combustion of biomass. They have capacity to absorb infrared heat and absorb it back.

In next class we will deal with major greenhouse gases and their sources of emission.
