© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 07 Issue: 04 | July – September 2016
Paper is available at www.jrps.in | Email : info@jrps.in

Study of Green House effect, global warming, consequences and significance

Kirti , Assistant professor, Deptt. of Zoology.

Introduction : The exchange of incoming and outgoing radiation that warms the Earth is often referred to as the greenhouse effect because a greenhouse works in much the same way. Incoming UV radiation easily passes through the glass walls of a greenhouse and is absorbed by the plants and hard surfaces inside. Weaker IR radiation, however, has difficulty passing through the glass walls and is trapped inside, thus warming the greenhouse. This effect lets tropical plants thrive inside a greenhouse, even during a cold winter.

Earth is constantly bombarded with enormous amounts of radiation, primarily from the sun. This solar radiation strikes the Earth's atmosphere in the form of visible light, plus ultraviolet (UV), infrared (IR) and other types of radiation that are invisible to the human eye.

UV radiation has a shorter wavelength and a higher energy level than visible light, while IR radiation has a longer wavelength and a weaker energy level. About 30 percent of the radiation striking Earth's atmosphere is immediately reflected back out to space by clouds, ice, snow, sand and other reflective surfaces, according to NASA. The remaining 70 percent of incoming solar radiation is absorbed by the oceans, the land and the atmosphere. As they heat up, the oceans, land and atmosphere release heat in the form of IR thermal radiation, which passes out of the atmosphere and into space.

It's this equilibrium of incoming and outgoing radiation that makes the Earth habitable, with an average temperature of about 59 degrees Fahrenheit (15 degrees Celsius), according to NASA. Without this atmospheric equilibrium, Earth would be as cold and lifeless as its moon, or as blazing hot as Venus. The moon, which has almost no atmosphere, is about minus 243 F (minus 153 C) on its dark side. Venus, on the other hand, has a very dense atmosphere that traps solar radiation; the average temperature on Venus is about 864 F (462 C).

Causes the greenhouse effect :

The greenhouse effect is caused by the interaction of the sun's energy with greenhouse gases such as carbon dioxide, methane, nitrous oxide and fluorinated gases in the Earth's atmosphere. The ability of these gases to trap heat is what causes the greenhouse effect.

© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 07 Issue: 04 | July – September 2016
Paper is available at www.jrps.in | Email : info@jrps.in

Greenhouse gases are made of three or more atoms. This molecular structure makes it possible for these gases to trap heat in the atmosphere and then re-emit it towards the surface which further warms the Earth. This continuous cycle of trapping heat leads to an overall increase in global temperatures. This process, which is very similar to the way a greenhouse works, is why the gases that can produce this effect are collectively known as greenhouse gases.

The principal forcing gases of the greenhouse effect are:

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Fluorinated gases
- Water vapor

Carbon dioxide, methane, nitrous oxide and the fluorinated gases are all well-mixed gases in the atmosphere that do not react to changes in temperature and air pressure, so the levels of these gases are not affected by condensation. Water vapor on the other hand, is a highly active component of the climate system that responds rapidly to changes in conditions by either condensing into rain or snow, or evaporating to return to the atmosphere. Thus the impact of the greenhouse effect is primarily circulated through water vapor, and it acts as a fast feedback.

Carbon dioxide and the other non-condensing greenhouse gases are the key gases within the Earth's atmosphere that sustain the greenhouse effect and control its strength. Water vapor is a fast-acting feedback but its atmospheric concentration is controlled by the radiative forcing supplied by the non-condensing greenhouse gases.

In fact, the greenhouse effect would collapse were it not for the presence of carbon dioxide and the other non-condensing greenhouse gases. Together the feedback by the condensing and the forcing by the non-condensing gases within the atmosphere both play an important role in the greenhouse effect.

Greenhouse gases and global warming

"Gas molecules that absorb thermal infrared radiation, and are in significant enough quantity, can force the climate system. These type of gas molecules are called greenhouse gases," Michael Daley, an associate professor of Environmental Science at Lasell College told Live Science. Carbon dioxide (CO2) and other greenhouse gases act like a blanket, absorbing IR radiation and

© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 07 Issue: 04 | July – September 2016
Paper is available at www.jrps.in | Email : info@jrps.in

preventing it from escaping into outer space. The net effect is the gradual heating of Earth's atmosphere and surface, a process known as global warming.

These greenhouse gases include water vapor, CO2, methane, nitrous oxide (N2O) and other gases, according to the Environmental Protection Agency (EPA). Since the dawn of the Industrial Revolution in the early 1800s, the burning of fossil fuels like coal, oil and gasoline have greatly increased the concentration of greenhouse gases in the atmosphere, especially CO2,

The greenhouse effect, combined with increasing levels of greenhouse gases and the resulting global warming, is expected to have profound implications, according to the near-universal consensus of scientists.

Consequences of Global Warming

A whole host of consequences will result. Some are probably already occurring.

- Temperature measurements of the sea surface and deep ocean indicate that the oceans are warming. Rising ocean temperature causes rising sea level from thermal expansion of the water.
- Rising temperature also means melting glaciers and rising sea level through addition of meltwater to the oceans. Sea level rose about 1 foot during the last century, mostly from thermal expansion of the oceans. Sea level is expected to rise closer to 3 feet during the coming century.
- Rising sea level will cause increasing coastal erosion, flooding, and property damage during coastal storms on top of the potential for major loss of life from storms in low-lying coastal countries like Bangladesh and island nations in the Indian and Pacific Oceans.
- Warmer sea surface temperatures will result in more and stronger tropical storms (hurricanes and typhoons). Coastlines already ravaged by these storms will expect to see more strong storms than before, increasing the loss of life and damage to infrastructure.
- It is much more difficult to predict how regional and local weather patterns will change but there will certainly be changes.
- While higher temperatures will produce more rainfall across the globe, the regional rainfall patterns will likely change. Some areas will get more, some areas will get less. The timing of wet and dry periods may change.

© INTERNATIONAL JOURNAL FOR RESEARCH PUBLICATION & SEMINAR
ISSN: 2278-6848 | Volume: 07 Issue: 04 | July – September 2016
Paper is available at www.jrps.in | Email : info@jrps.in

- But higher temperatures will also mean more evaporation. Higher temperatures may also mean stronger storms with damaging winds. All of these mean new risks and changing conditions for agriculture.
- Centuries old farming practices will have to change. Some areas may go from being marginal to becoming a breadbasket region, while other regions may go from major agricultural production to marginal.
- Higher CO2 allows plants to grow faster (more CO2 enhances photosynthesis). That would sound good for agriculture. However, weed species tend to grow even better than crop plants under enhanced CO2 conditions so improved crop growth may be nullified by weed competition.
- Natural ecosystems will be hard pressed to keep up with the changing climate because the rate of change will be faster than typical long-term natural climate change. Many species, especially plant species, will not be able to migrate to cooler areas fast enough to keep up with the warming of their habitats. And arctic species will have no place to go and may not be able to adapt to the new conditions.
- Severe summer heat in areas not used to it can lead to deaths. Higher heat and expansion of tropical areas may lead to increased incidence of malaria.

References :

1. http://www.livescience.com/37743-greenhouse-effect.html
2. http://timeforchange.org/responsibility_and_carbon_footprint
3. https://en.wikipedia.org/wiki/Greenhouse_effect
4. http://www.bgs.ac.uk/discoveringGeology/climateChange/CCS/consequencesOfTemperatureIncrease.html