

Our Atmosphere is like a Greenhouse

A greenhouse is a building with glass or plastic roof and walls, used for cultivation and protection of plants and of those plants which grow out of season. These greenhouses are designed to control the balance of temperature, moisture, and light needed to grow a variety of plants in one location.

Natural sunlight usually meets the requirements for plants during spring, summer and fall, but artificial light is even sometimes used in winter. In winter most of the heat comes from the sun, hot-water, or hot-air circulating systems. The heat in the summer time can be reduced with ventilators, fans, and many other methods and humidity is controlled by the amount of water in the soil.



This is how the method of global warming got its name: Greenhouse effect. This is the term used for the role the atmosphere plays in warming the earth's surface. The atmosphere is widely transparent to incoming solar radiation, absorbed by the earth's surface. A major part of these heat waves are then reemitted, but they are then reflected back to the earth by gases in the atmosphere. The reflected radiation maintains the earth's temperature.

The Climate System

The earth's climate is predicted to change because of Greenhouse gases: carbon dioxide, methane, and nitrous oxide.

Energy from the sun drives the earth's weather and climate, and heats the earth's surface; in turn, the earth radiates energy back into space. Greenhouse gases trap some of the outgoing energy, retaining heat somewhat like the glass of a panel greenhouse.

Without this natural greenhouse effect, temperatures would be lower and life would not be possible as known today. Problems may rise when the atmospheric concentration of greenhouse gases increases. Since the beginning of the industrial revolution, concentrations of carbon dioxide have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide have risen 15%. All of these increase in gases have enhanced the heat-trapping of the earth's atmosphere. Sulphate aerosols, a common air pollutant, cool the atmosphere by reflecting light back into space, however sulphates are short lived in the atmosphere.

Why are greenhouse gas concentrations increasing? The combustion of fossil fuels and human activities are the primary reason for the increase of carbon dioxide. Plant respiration and the composition of organic matter release more than ten times the carbon dioxide released by human activities, but these have always been in balance with the CO₂ absorbed by plant photosynthesis. Energy burned to run cars and trucks, heat homes and businesses, and power factories is responsible for about of 80% of society's CO₂ emissions, about 25% methane emissions, and 20% nitrous oxide emission. Increased agriculture, deforestation, landfills, industrial production, and mining also contribute to other emissions.

Global Climate Changes

There are many consequences that result from the increasing concentrations of greenhouse gases.

TEMPERATURE: Global temperatures are rising. Observations suggest that the average land surface temperature has risen 0.45–0.6°C in the last century.

PRECIPITATION: Precipitation has increased by about 1% globally in the last century. High latitude areas are tending to see even more increases in rainfall, while in tropical areas it has declined.

SEA LEVEL: Sea level has risen approximately 15–20 cm in the last century world-wide. About 2–5 cm from the melting of mountain glaciers and another 2–7 cm from the expansion of ocean water due to warmer ocean temperatures.

Atmospheric Change

Even though aerosols are being added to the atmosphere, greenhouse gases that warm the earth's temperature stay in the atmosphere longer than the aerosols that cool the earth and the earth's average temperature is then likely to continue to warm.

(Past) The temperatures depend mainly on the amount of sunlight received, the amount reflected into space, and the extent to which the atmosphere retains heat. (Future) The extent and speed at which humanity changes the climate will depend widely on the rate at which the society adds additional greenhouse gases.

Actions Being Taken to Prevent

Today, action is occurring at all levels to reduce, avoid, and understand better the risks associated with climate change. All around the world countries have prepared greenhouse gas inventories and may be actively pursuing programs and policies that will reduce the emission of greenhouse gases. Countries around the world have strengthened international responses to the risks of climate change.

Local governments have many possible reasons to take actions that reduce greenhouse emissions. For example, if a city decides to install LED traffic signals in order to save money through lower bills, improve air quality, reduce health risks due to ozone levels, or reduce traffic congestion. By installing these signals we reduce greenhouse gases. By including greenhouse gas benefits in their consideration of policies and programs, decision makers may find a motivation to take actions that prevent global warming. Though they may not recognize the benefits the actions have in other areas, we can achieve good air and water quality or improve public health. These co-benefits can bring direct results to communities and they should be included in the greenhouse policies.

Geothermal heat pumps (GHPs) are the most efficient and comfortable heating and cooling technologies for homes and other buildings. GHPs take advantage of the nearly constant temperatures of the earth a few feet below the surface, collecting heat from the earth during the heating season and transferring heat from the building to the earth during the cooling season. This technology, used in homes, stores, office and public buildings, reduce world-wide energy use and pollution.

Impacts on Climate Change

Rising global temperatures are expected to raise sea level, change precipitation and local climate conditions. This could affect forests, crop fields, and water supplies. It could also harm human's health, birds, fish, and ecosystems. Deserts may expand and some national parks may be affected.

Health

Human's health depend largely on local climate. Extreme temperatures can cause the loss of life. Several diseases only appear in warm areas. People with heart problems are vulnerable in this case. And the air and water pollution, caused by warm temperatures can harm human health as well. Higher air temperatures also increase the concentration of ozone at ground level and this is a harmful pollutant at this level. This can cause problems for people with asthma and other lung diseases. As well as chest pains, nausea, and pulmonary congestion. Death rates increase during extremely hot days, especially in cities. We can prevent this by installing air conditionings and by acclimatising ourselves. During cold weather only half of the amount of people die than those due to warmer climates.

Diseases spread by insects are more prevalent during the warmer temperatures, for example malaria, dengue fever, yellow fever, and encephalitis. Heat related deaths can be prevented by emergency measures to move vulnerable people to areas where they are not affected, the maintenance of strong public health problems, and treat the spread of infectious diseases. Although some preventions taken into account may be expensive, it's much more preventable than what would otherwise occur.

Water Resources

Changing climate is expected to increase precipitation and evaporation. In areas where evaporation will increase, soil will be drier, lake levels will drop, and rivers will carry less water. This could affect navigation, hydroelectric power generation, and water quality, and even reduce the supplies of water used for agriculture, residents and industries. Tendency of rainfall will increase river flooding.

Many agencies are reducing the countries' vulnerability to these impacts. Where freshwater is scarce, allowing farmers to sell water is letting scarce water to be used more efficiently. In floodplains, agencies are reviewing land-use measures for reducing floods to occur. Engineers are developing better ways to manage reservoirs.

Forests

The warming could shift forest species. If the climate changes slowly enough, warmer temperatures may enable trees to colonise into cooler areas. If the earth warms 2°C in 100 years, species would have to migrate about 2 miles each year. Trees whose seeds are spread by birds may spread at that rate. Poor soils reduce the rate at which trees spread.

But CO₂ fertilises plants and enables them to use water more efficiently. And this may enable species to resist effects of warmer temperatures or drier soils. On the other hand, forest fire can become more frequent if soils become drier.

If climate becomes wetter, than forests will expand towards range lands and other drier areas. If habitats shift to cooler areas, many forms of wildlife could potentially adapt to global warming, however, roads, development, and the modifications to nature may block migration routes.

Deserts

Are deserts likely to expand? There are suggestions that yes, this may occur world-wide. Soils are extremely dry in these areas, because evaporation and transpiration are greater than the amount of rainfall. If temperatures were to rise by 4°C, then evapo-transpiration would increase by 30–40%, while precipitation only by 10–15%.

Non-Tidal Wetlands

Wetlands cover about 4–6% of the land's surface. This is an area that is flooded part of the time but not all the time. Wetlands have ample supplies of water, minerals, and both. These areas are important habitats for birds, fishes, and other species. Wetlands also prevent pollutants from farms and other activities that pollute rivers, lakes, and streams.

There are coastal wetlands and inland wetlands. Coastal wetlands are mostly marshes and swamps flooded by tides. Inland wetlands include wetlands along rivers, lakes, and isolated wetlands that are not connected to a major body of water.

Climate changes in these areas depend on the amount of rainfall and when it occurs. Where the climate becomes drier, drought will tend to lower water tables. A drier climate could also increase a farmer's use of irrigation, which could lower groundwater tables and drain prairie potholes. A wetter climate would have the opposite effect. Changing climate could increase or decrease vegetation. If precipitation increase, flooding may increase the area where floodplain wetlands could form. If runoff were to increase siltation, and additional marshes may form.

Climate change may also depend on how people respond to the increased flood risk. If people move out of dangerous areas, there will be more undeveloped land. If people build dams, river levees, and other methods to prevent floods, the area would decrease.

Coastal Zones

Sea level will probably continue to rise for several centuries, even if global temperatures were to stop rising. Rising sea level inundates wetlands and other low lying lands, erodes beaches, intensifies flooding, and increases the salinity of some bodies of water. Measures that people take to protect their properties from rising sea level, may affect the environment and public uses of beaches. Governments are also taking measures into account. Coastal marshes and swamps are also vulnerable to the rising sea level. As the sea rises, the outer boundary of these wetlands will erode and new ones will form as previous dry areas are flooded by higher water levels. However, the amount of new wetlands will be smaller than the amount lost. And the amount of dry lands are much less than the area of wetlands that would be lost. But developed areas will be protected with bulkheads, dikes and other structures that keep new wetlands from forming inland.

Agriculture

The success or failure of a harvest has always depended on climate, with moist soil being the most important factor. During droughts, crop failures have been widespread. And these conditions can spread even more due to drier soils that may accompany changing climates. Increased heat, more flooding, and salinization of soils due to sea level rise could also harm agriculture. In colder areas, warmer temperature could lengthen growing season. And the levels of atmospheric CO₂ may enable the rapid growth of plants. The mix of crops and livestock in a region is influenced by climatic conditions and the amount of water available. Changing climate could have important regional dislocations, but the food production will not decline.

By changing the use of crops, fertilisers and growing seasons, crop yields could be maintained. Warmer temperatures would make it more profitable to cultivate new lands, increasing the amount of production and that the warming expected in the next couple of years will increase agricultural production.

Fisheries

Global warming could have many impacts on fish and other aquatic species. Water may become too warm for the fish to inhabit it, but warmer temperatures may also enable fish in cold oceans to grow more rapidly. Global warming may also change the chemical composition of the water, the amount of oxygen in the water may decline, and pollution and salinity may increase. Loss of wetlands could also diminish habitats and affect

the amount of food for some fish species. The implications of three types of fisheries are: inland freshwater fisheries found in non-tidal rivers, lakes and streams; coastal fisheries, which extend from tidal freshwater rivers, to estuaries, to coastal ocean fisheries; and deep ocean fisheries.

Birds

Climate changes are likely to have both direct and indirect effects on birds. Higher temperatures can directly affect their life cycles. The loss of their habitats could have an indirect effect by making some regions less hospitable to birds. As temperatures warm, birds will tend to inhabit towards the Northern Hemisphere. Warmer temperatures may also affect how birds respond to the change in seasons. Several birds that fly north arrive 2 or 3 weeks earlier than in 1960. And many species are laying eggs 9 days earlier than in 1971, this is because plants and flowers are growing sooner, which in turn causes earlier availability of the insects that these birds eat. So birds will be a week or so older when it comes to migrate, which may improve the survival of their first winter. Changing climate may impair the synchronisation of a bird's life cycle with its food supply. The loss of beaches caused by rising sea level would also decrease the available habitat and the feeding areas as well. A drier climate would also decrease the amount of open water ponds, which would reduce the amount of duck.