Without the heating caused by the greenhouse effect, Earth's average surface temperature would be only about −18 °C (0 °F). The main gases responsible for the greenhouse effect include carbon dioxide, methane, nitrous oxide, and water vapor (which all occur naturally), and fluorinated gases (which are synthetic).

Natural sources of emissions of gases to the atmosphere include respiration and decomposition of plants and ocean. The largest source of greenhouse gas emissions from human activities is from burning fossil fuels for electricity, heat, and transportation. Despite carbon dioxide's low global warming potential among major greenhouse gases, the large human-caused increase in its atmospheric concentration has caused the majority of global warming. Human activities particularly burning of fossil fuels (coal, oil and natural gas), agriculture and land clearing are increasing the concentrations of greenhouse gases which is contributing to warming of the Earth. The flooding of coastal cities, the desertification of fertile areas, the melting of glacial asses and the proliferation of devastating hurricanes are some of the main consequences.

Humans can reduce the level of greenhouse gases by using public transportation, carpooling, biking, and walking, leads to fewer vehicles on the road and less greenhouse gases in the atmosphere. We should minimise the amount of waste we produce, reusing products as much as we can, and remembering to recycle any materials that can be used for a new purpose. Reducing tillage, expanding crop rotations, planting cover crops and reintegrating livestock into crop production systems have proven to reduce agriculture's own footprint. Carbon capture and sequestration (CCS) is the process of capturing carbon dioxide (CO_2) formed during power generation and industrial processes to reduce carbon dioxide emissions in sedimentary rocks. In Pakistan, government initiatives include a plan to reduce its greenhouse gas emissions by 20% of that expected in 2030 and particularly reduce carbon emissions through enhancing renewable energy and more effective use of water in agriculture diminishing the need for diesel-powered pumping.

Introduction

Greenhouse effect

The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse gases.

The greenhouse effect occurs because the sun bombards Earth with enormous amounts of radiation that strike Earth's atmosphere. The atmosphere allows most of the visible light from the Sun to pass through and reach Earth's surface. As Earth's surface is heated by sunlight, it radiates part of this energy back toward space as infrared radiation. This radiation, tends to be absorbed by the greenhouse gases in the atmosphere, raising its temperature. The heated atmosphere in turn radiates infrared radiation back toward Earth's surface

Water vapour

Water vapour is the most potent greenhouse gas in Earth's atmosphere, but its behaviour is fundamentally different from that of the other greenhouse gases. The primary role of water vapour is not as a direct agent of radiative forcing but rather as a climate feedback. The warmer the surface, the greater the evaporation rate of water from the surface. As a result, increased evaporation leads to a greater concentration of water vapour in the lower atmosphere capable of absorbing infrared radiation and emitting it back to the surface.

Surface-level ozone

Most significant greenhouse gas is surface, or low-level, ozone (O_3). Surface O_3 is a result of air pollution; it must be distinguished from naturally occurring stratospheric O_3, which has a very different role in the planetary radiation balance.

The primary anthropogenic source of surface O_3 is photochemical reactions involving the atmospheric pollutant carbon monoxide (CO). Ozone concentrations can rise to unhealthy levels (that is, conditions where concentrations meet or exceed 70 ppb for eight hours or longer) in cities prone to photochemical smog.

Global warming potential (GWP) of greenhouse gases

The Global Warming Potential (GWP) is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period.

Carbon dioxide has a GWP of 1 regardless of the time period used, because it is the gas being used as the reference. Methane (CH_4) is estimated to have a GWP of 28–36 over 100 years. Nitrous Oxide (N_2O) has a GWP 265–298 times that of CO_2 for a 100-year timescale. Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) are sometimes called high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO_2.