

Global Warming

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(Ph.D Scholar)

I. Introduction:

Human activities are enhancing the greenhouse effect. The theory of greenhouse effect was formulated in 1847. According to this theory the earth's atmosphere acts like the transparent glass cover of greenhouse. Visible sunlight passes through the glass or to strike the earth's surface. Ocean and land reflect the incoming solar energy as invisible infrared radiation. Acting like the greenhouse glass or car window the earth's atmosphere traps some of that heat. The greenhouse effect increases the temperature and leads to climatic change. There is little scientific that air temperatures are the highest since recordings were begun in earnest more than 100 years ago. In term of palaeoclimatology, the science that studies past climates, earth is within one degree Celsius of equating the highest average temperature of the past 125000 years. The rate of warming in the past 30 years exceeds any comparable period in the temperature record, according to NASA scientist, and is thought to be attributable to a buildup of greenhouse gaseous. Climatologists Richard Houghton and George Woodwell describe the present climatic condition in the following words:

The world is warming. Climatic zones are shifting. Glaciers are melting. Sea level is rising. These are not hypothetical events from a science fiction movies; these changes and others are already taking place, and we expect them to accelerate over the next years as the amounts of carbon dioxide, methane and other trace gases accumulating in the atmosphere through human activities increase.

II. Carbon Dioxide and Global Warming

Radiatively active gases are atmospheric gases, such as carbon dioxide, methane, CFC's and water vapor, that absorb and radiate infrared wavelengths. Carbon dioxide is the principle radiatively active gas causing earth's natural greenhouse effect. It is transparent to light but opaque to the infrared wavelengths radiated by earth and thus its presence delays heat loss to space. While detained, that heat energy is absorbed and reradiated over and over producing warmth in the lower atmosphere. As concentration of these heat absorbing gases increase, more heat is maintained in the atmosphere and temperature increase. Carbon dioxide alone is thought to be responsible for almost 60 percent of the global warming trend. Carbon dioxide is presently increasing in concentration at the rate of more than 4 percent per year. This increase appears sufficient override any natural climatic tendencies towards a cooling trend, as well as to produce possible unwanted global warming in the next century.

Chlorofluorocarbons and Global Warming : Chlorofluorocarbons are thought to be contribute about 25 percent of the global warming. CFCs absorb infrared wavelengths missed by carbon dioxide and water vapor in the lower troposphere. As radiatively active gases, CFCs enhance the greenhouse effect, and also play a negative role in stratospheric ozone depletion.

Warming Indications and the Future : A global average temperature of 15.4 degree Celsius was reached in 1990. The eruption of Mount Pinatubo lowered temperatures in 1991; otherwise, that year would have placed first. The 1990 IPCC report concluded that there is "virtual unanimity among greenhouse experts that a warming is on the way and that the consequences will be serious". IPCC affirmed their major conclusions in 1992 and 1994 updates: human-produced emissions of Carbon Dioxide, Methane, CFCs and Nitrous Oxide are substantially increasing atmospheric concentrations of these gases. Also, they affirm that a warming trend is occurring. However, uncertainties remain as to magnitude, timing and specific regional patterns. A minority of scientists persists as critics of the greenhouse warming model, and although no member of the IPCC agrees with these critics, all points of view must be considered.

Any change in ocean temperature has a profound effect on weather and, indirectly, on agriculture and soil moisture. Even the warming of the ocean itself will contribute about 25 percent of sea level rise due to thermal expansion of the water. Looking at the global warming and sea level change, the coastal lowland countries of the Netherlands, Bangladesh and Maldives have for many years been outspoken advocates of reduction in greenhouse gases.

Consequences of Climatic Warming : The consequences of uncontrolled atmospheric warming are complex. Regional climate responses are expected as temperature, precipitation, soil moisture, and air mass characteristics change. Although the ability to accurately forecast such regional changes is still evolving, some implications of warming are forecasted. Significant increases are being recorded to depths of over 300 meters as ocean temperature records are set.

III. Effects on World Food Supply and the Biosphere

Modern single-crop agriculture in the developed countries is more delicate and susceptible to changes in temperature, water demand and irrigation needs, soil chemistry, than traditional multicrop agriculture in the developing countries. The southern and central grain-producing areas of North America are forecast to experience hot and dry weather by the middle of the next century as a result of higher temperatures. Scientists have considered possible adaptations, such as changing crop varieties to late maturing, heat-resistant types, and adjustments in soil management practices, such as fertilizer applications and irrigation schedules. Also, land based animals will have to adapt to changing patterns of available forage, for animals are adapted to the climate zones in which they live. Increased temperatures are already causing thermal stress to some embryos as they reach their thermal limits. Particularly affected are amphibians whose embryos develop in shallow water. Warming of ocean water is endangering corals worldwide, and they appear to be deteriorating at record levels. The possibility exists that billions of dollars of agricultural losses in one region could be countered by billions of dollars of gain in another.

Melting Glaciers and Ice Sheets : Perhaps the most pervasive climatic effect of increased warming would be the rapid escalation of ice melt. The additional water, especially from continental ice masses that are on land, would raise sea level worldwide. Satellite remote-sensing technology allows monitoring of global sea ice and continental ice to track evolving trends. Worldwide measurements confirm that sea level has been gradually rising this century. Scientists currently are studying the ice sheets of Greenland Antarctica for possible changes in the operation of the hydrologic cycle, including snowlines and the rate at which icebergs break off into the sea. The key area being watched is the West Antarctica ice sheet, where the Ross ice shelf holds back vast grounded ice masses. The flow from several visible ice streams (channel of flowing ice) is accelerating from the ice sheet. Several interpretations for these changes are possible. There is conclusive evidence for a worldwide recession of mountain glaciers. This is among the clearest and best evidence for a change in every balance at the earth's surface the end of the last century.

A quick survey of world coastlines shows that even moderate changes could bring disaster of unparalleled proportions. At stake are the river deltas, lowland coastal farming valleys and low-lying mainland areas. In the worst possible scenario, a rise of 6 meters would flood 20 percent of Florida, inundate the Mississippi floodplain as far inland as St. Louis, flood the Pampas of Argentina, drown Venice, submerge Bahamas, Netherlands, Mumbai, Chennai, Kolkata, cities of Saurashtra, Karachi, Dhaka, Jakarta, Maldives, and more. All surviving coastal areas would contend with high water and high tides, but this is with a worst possible scenario.

References:

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