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Higher CO_2, More Global Warming, and Less Extinction?

by Christopher Lingle

It is widely believed that humans exert a harmful impact on the natural environment, especially when it comes to releasing greenhouse gases into the atmosphere. And so there is some alarm that the amount of carbon dioxide (CO_2) in the atmosphere has risen by 25–30 percent in the last 200 years.

One viewpoint has become known as the "CO_2-induced global warming extinction hypothesis," which projects greater extinction of species. The combination of global warming and an increase in atmospheric CO_2 will supposedly cause plants and animals that cannot escape the stress from rising temperatures to become extinct.

In January a study published in the journal *Nature* projected that 15–37 percent of species will become extinct by the middle of the century at current rates of global warming. The study came under immediate criticism. An earlier examination of this hypothesis was conducted by the Marshall Institute in partnership with the Center for the Study of Carbon Dioxide and Global Change.

The study, "The Specter of Species Extinction: Will Global Warming Decimate Earth's Biosphere?," concluded that claims of mass extinctions arising out of climate change are unsupported by facts.[1] The extinction hypothesis ignored the fact that CO_2 enrichment tends to offset the negative effects of rising temperatures on vegetation.

The findings contradict claims that man-made climate change can cause significant increases in the rate of species extinction. First, they point out that there is a lack of definitive knowledge on how many species exist and what the rate of natural extinction might be. Further, it is not known how many species are becoming extinct because of other human or nonhuman causes.

If we accept the worst-case scenario that the earth is getting warmer and CO_2 concentrations are increasing, most species would respond by adapting, acclimatizing, or migrating. In the case of plant life, increasing the amount of CO_2 will induce changes that make them better adapted to warmer conditions. Indeed, more CO_2 allows them to grow better at almost all temperatures, especially at higher temperatures. And so, elevated CO_2 content improves the ability of plants to resist heat stress and also raises the optimum temperature for growth.

In other words, a rise in atmospheric temperature combined with a higher CO_2 concentration makes it easier for plants to

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adapt. Since the range of adaptation of most plants will likely expand if the planet warms, extinctions will become less likely than they are at present.

Additional evidence of this was reported in *Science*.[2] According to climatic and satellite data gathered since 1982, global plant productivity has increased by 6 percent with the largest gains in tropical ecosystems. Part of the rise in plant growth was due to diminished cloud cover, leading to a rise in solar radiation in the tropics.

Since rising plant productivity sucks in carbon dioxide from the atmosphere, "carbon sinks," such as large forested areas, can offset the production of rising carbon gases. This means that increased concentrations of CO_2 are more likely to cause temperatures to go down rather than go up.

Animals can be expected to react similarly to simultaneous increases in atmospheric temperature and CO_2 concentration by migrating toward the poles or higher altitudes. By increasing the boundaries of their ranges, most species will increase the probability of survival.

If we succeed in curtailing manmade CO_2 emissions, our actions might actually impose a greater challenge to life forms in the biosphere. This is because a sudden stop in the increase of CO_2 content in the air would block the physiological transformation of plants that provides them with protection against heat stress.

Do Human Beings Cause Climate Change?

But it looks unlikely that curbing the impacts of human activity on global warming will alter the general pattern being claimed. A study covering the period from 1856 to 2002 looked at the relationship of solar-flare activity to statistical fluctuations in the earth's near-surface air temperature.[3] It revealed a stronger physical connection between climate and solar activity than was previously thought by most scientists. These results imply that variations in global temperatures are beyond human control because they are mostly determined by the sun.

Even the threat of climbing temperatures alone need not be a cause for alarm. While a consensus points to an increase in temperature of about half a degree centigrade over the last 100 years, this is no surprise since global temperature averages always change. History is replete with periods of global cooling and global warming; periods of rising temperature give way to periods of falling temperatures.

Richard Lindzen, an atmospheric scientist at MIT and a contributor to the report issued by the UN Intergovernmental Panel on Climate Change (IPCC), points out that most climate models do not take into account how clouds behave. Such neglect exaggerates estimates of warming since climate sensitivity becomes impossible to predict. This is because the response measured by the models depends primarily on water vapor and clouds.

Research Lindzen performed with NASA scientists revealed that clouds over the tropics act like a thermostat and will limit warming.[4] In warm regions clouds react to rising temperatures by contracting to release heat, and to falling temperatures by expanding and trapping it. They expect that warming will be not much more than one degree centigrade, but probably less, by 2100.

Most of the information above contradicts the conventional wisdom that blankets the mainstream media. Citizens with limited technical knowledge about the environment should find reassurance in divergent scientific viewpoints. □

1. www.co2science.org/reports/extinction/mr1toc.htm.

2. Ramakrishna R. Nemani, et al., "Climate-Driven Increases in Global Terrestrial Net Primary Production from 1982 to 1999," *Science*, June 6, 2003, pp. 1560–63.

3. Nicola Scafetta and Bruce J. West, "Solar Flare Intermittency in the Earth Temperature Anomalies," *Physical Review Letters*, June 17, 2003, p. 248701.

4. Richard S. Lindzen, Ming-Dah Chou, and Arthur Y. Hou, "Does the Earth Have an Adaptive Infrared Iris?" *Bulletin of the American Meteorological Society*, vol. 82, no. 3, 2001, pp. 417–32.