

Earth Sciences

From papers presented this week at an American Geophysical Union meeting in Montreal

Poll finds global environmental concern

Citizens polled in 22 countries indicate they see environmental ills as a serious problem that increasingly threatens human health. The survey of over 22,000 people contradicts the widespread view that only rich nations are concerned about the environment, according to the Gallup International Institute in Princeton, N.J., which organized the poll and released its results this month.

Majorities in 19 of the 22 countries express at least a fair amount of concern about environmental problems, the survey shows. In all countries, majorities believe environmental problems will affect the health of their children and grandchildren. In 16 countries, including several poor nations, most citizens expressed a willingness to pay higher prices for increased environmental protection. That finding "is perhaps the strongest evidence we found of worldwide concern for the environment," says the Gallup Institute.

When asked to judge the seriousness of seven different problems, survey participants were most likely to label water pollution and loss of rain forests as very serious issues. Following these problems were ozone depletion, air pollution, loss of species, global warming and contaminated soils.

Contrary to expectations, persons in developing countries did not generally blame the richest nations for environmental degradation, the poll reveals. Instead, they typically blamed developing and developed countries equally. On the other side of the economic scale, majorities in five of the 11 richest countries said the industrialized nations deserve the blame for environmental problems. "These findings suggest that the polarization between representatives of rich and poor nations in preparations for the [United Nations' Earth Summit in Rio de Janeiro next week] may exaggerate the positions of their constituents," says the Gallup Institute. Among respondents from rich countries, U.S. citizens were least likely to blame the industrialized nations.

Gallup affiliates conducted the poll through face-to-face interviews in Brazil, Canada, Chile, Denmark, Finland, Germany, Great Britain, Hungary, India, Ireland, Japan, Mexico, Netherlands, Norway, Philippines, Poland, Russia, South Korea, Switzerland, Turkey, United States and Uruguay.

Climate change: A diversity of views

A poll of scientists involved in climate research reveals substantial disagreement over predictions on global warming. At the same time, the researchers do not advocate delaying action on the issue.

Conducted by social scientists at the State University of New York at Albany, the poll, released in March, queried 118 scientists, almost all of whom had participated in some activity related to climate change research. The pollsters selected respondents through a computer-based network that primarily serves oceanic and atmospheric scientists.

One section of the poll addressed the projections given by the Intergovernmental Panel on Climate Change (IPCC) — an international group of over 100 scientists that sought to provide a consensus report for policymakers. The IPCC estimated that the global average temperature would warm by about 0.3°C per decade, with an uncertainty range of 0.2°C to 0.5°C per decade. The results of the poll show that roughly a third of the scientists had views closely matching the IPCC estimate. Another third felt less certain; they attached a wider range of possibilities to the projected warming rates. A smaller group thought the IPCC projected rate of warming was too high.

The researchers, however, showed more consensus on a policy-related question. Roughly three-quarters of those polled disagreed with the statement: "... the current uncertainties are such that a delay in taking action is the proper policy."

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Environment

Volcanic bite out of Antarctic ozone?

Sulfur from a volcanic eruption in Chile may have helped chemical pollution create the most severe Antarctic ozone hole on record, reports Terry Deshler from the University of Wyoming in Laramie and his colleagues.

Ozone holes — regional thinnings in the ozone layer — have developed over the Antarctic continent each September since the late 1970s. During that month, chlorine and bromine chemicals destroy much of the ozone present in the stratosphere between altitudes of 12 and 23 kilometers.

This year, significant ozone loss also occurred between 10 and 12 km. According to measurements by balloon-borne instruments above McMurdo Station, ozone concentrations measured only half their normal levels at these altitudes. These lower-stratosphere depletions began at the same time particles from the eruption of Chile's Hudson Volcano reached Antarctica.

The region between 10 and 12 km is usually too warm to support the growth of clouds, which are critical to the ozone destruction process near the poles. But the volcanic particles apparently served as substitutes over Antarctica, fostering conditions that allowed pollution to break apart ozone molecules. Though this lower-stratosphere loss does not rival the more severe ozone depletions at higher altitudes, it did account for roughly 10 percent of the total ozone thinning, Deshler suggests.

Seasonal signs of pollutant cooling

Though greenhouse gases are rapidly accumulating in the atmosphere, the global average temperature has not risen as quickly as computer models suggested it would. Over the last few years, climate researchers have come to suspect that sulfur pollution — emitted by the combustion of fossil fuels — has exerted a cooling effect, counteracting part of the expected warming over some regions of the globe (SN: 4/11/92, p.232).

Researchers at the Brookhaven National Laboratory in Upton, N.Y., now report finding temperature trends that support the sulfur theory. David E. Hunter and his colleagues focused their attention on the middle latitudes of the northern hemisphere. Scientists believe sulfur pollution wields its greatest cooling effect in the middle latitudes because this heavily industrialized belt — which includes the United States, most of Europe, Russia and China — emits approximately 90 percent of the world's sulfur pollution. The Brookhaven team divided the temperature records by season, expecting that the light-reflecting pollution would show the most influence during summer, when sunlight is most intense.

Hunter and his colleagues found that from 1854 to 1910, the record shows a strong cooling in this region of the northern hemisphere during summer. That cooling does not appear in other regions or seasons. From 1910 to 1945, the trend reversed: The northern middle latitudes showed a strong summertime warming. Then from 1945 through 1989, they continued to warm in summer but at a much slower rate than other regions.

The researchers correlate the climate trends with changes in sulfur emissions. From 1854 to 1910, records show a dramatic rise in emissions, says Hunter, consistent with a cooling over the middle latitudes at that time. From 1910 to 1945, sulfur emissions remained relatively constant, while levels of greenhouse gases rose, a relationship that matches the observed warming over the northern middle latitudes. Around 1945, sulfur emissions began rising sharply — again consistent with the slower rate of warming over that part of the globe.

Hunter says the findings suggest the possibility that the cooling from sulfur pollution — at its strongest — has roughly canceled the warming from greenhouse gases over some parts of the globe.

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