Tweaking the climate to save it: Who decides?

April 3 2011, By CHARLES J. HANLEY , AP Special Correspondent

In this Wednesday, March 9, 2011 picture, a boy walks with an umbrella to protect himself from the rain, as dark clouds hover over him in Jammu, India. If Earth overheats, can it be artificially cooled? Should the effort begin now? Who would decide? The very idea of "geoengineering," and the unknown risks of tweaking our climate, left many participants in a March 2011 conference of international experts in Chicheley, England uneasy. (AP Photo/Channi Anand)

(AP) -- To the quiet green solitude of an English country estate they retreated, to think the unthinkable.

Scientists of earth, sea and sky, scholars of law, politics and philosophy: In three intense days cloistered behind Chicheley Hall's old brick walls, four dozen thinkers pondered the planet's fate as it grows warmer, weighed the idea of reflecting the sun to cool the atmosphere and debated the question of who would make the decision to interfere with

nature to try to save the planet.

The unknown risks of "geoengineering" - in this case, tweaking Earth's climate by dimming the skies - left many uneasy.

"If we could experiment with the atmosphere and literally play God, it's very tempting to a scientist," said Kenyan earth scientist Richard Odingo. "But I worry."

Arrayed against that worry is the worry that global warming - in 20 years? 50 years? - may abruptly upend the world we know, by melting much of Greenland into the sea, by shifting India's life-giving monsoon, by killing off marine life.

If climate engineering research isn't done now, climatologists say, the world will face grim choices in an emergency. "If we don't understand the implications and we reach a crisis point and deploy geoengineering with only a modicum of information, we really will be playing Russian roulette," said Steven Hamburg, a U.S. Environmental Defense Fund scientist.

The question's urgency has grown as nations have failed, in years of talks, to agree on a binding long-term deal to rein in their carbon dioxide and other greenhouse-gas emissions blamed for global warming. The Intergovernmental Panel on Climate Change (IPCC), the U.N.-sponsored science network, foresees temperatures rising as much as 6.4 degrees Celsius (11.5 degrees Fahrenheit) by 2100, swelling the seas and disrupting the climate patterns that nurtured human civilization.

Science committees of the British Parliament and the U.S. Congress urged their governments last year to look at immediately undertaking climate engineering research - to have a "Plan B" ready, as the British panel put it, in case the diplomatic logjam persists.

Britain's national science academy, the Royal Society, subsequently organized the Chicheley Hall conference with Hamburg's EDF and the association of developing-world science academies. From six continents, they invited a blue-ribbon cross-section of atmospheric physicists, oceanographers, geochemists, environmentalists, international lawyers, psychologists, policy experts and others, to discuss how the world should oversee such unprecedented - and unsettling - research.

An Associated Press reporter was invited to sit in on their discussions, generally off the record, as they met in large and small groups in plush wood-paneled rooms, in conference halls, or outdoors among the manicured trees and formal gardens of this 300-year-old Royal Society property 40 miles (64 kilometers) northwest of London, a secluded spot where Britain's Special Operations Executive trained for secret missions in World War II.

Provoking and parrying each other over questions never before raised in human history, the conferees were sensitive to how the outside world might react.

"There's the `slippery slope' view that as soon as you start to do this research, you say it's OK to think about things you shouldn't be thinking about," said Steve Rayner, co-director of Oxford University's geoengineering program. Many geoengineering techniques they have thought about look either impractical or ineffective.

Painting rooftops white to reflect the sun's heat is a feeble gesture. Blanketing deserts with a reflective material is logistically challenging and a likely environmental threat. Launching giant mirrors into space orbit is exorbitantly expensive.

On the other hand, fertilizing the ocean with iron to grow CO2-eating plankton has shown some workability, and Massachusetts' prestigious

Woods Hole research center is planning the biggest such experiment. Marine clouds are another route: Scientists at the U.S. National Center for Atmospheric Research in Colorado are designing a test of brightening ocean clouds with sea-salt particles to reflect the sun.

Those techniques are necessarily limited in scale, however, and unable to alter planet-wide warming. Only one idea has emerged with that potential.

"By most accounts, the leading contender is stratospheric aerosol particles," said climatologist John Shepherd of Britain's Southampton University.

The particles would be sun-reflecting sulfates spewed into the lower stratosphere from aircraft, balloons or other devices - much like the sulfur dioxide emitted by the eruption of the Philippines' Mount Pinatubo in 1991, estimated to have cooled the world by 0.5 degrees C (0.9 degrees F) for a year or so.

Engineers from the University of Bristol, England, plan to test the feasibility of feeding sulfates into the atmosphere via a kilometers-long (miles-long) hose attached to a tethered balloon.

Shepherd and others stressed that any sun-blocking "SRM" technique - for solar radiation management - would have to be accompanied by sharp reductions in carbon dioxide emissions on the ground and some form of carbon dioxide removal, preferably via a chemical-mechanical process not yet perfected, to suck the gas out of the air and neutralize it.

Otherwise, they point out, the stratospheric sulfate layer would have to be built up indefinitely, to counter the growing greenhouse effect of accumulating carbon dioxide. And if that SRM operation shut down for any reason, temperatures on Earth would shoot upward.

The technique has other downsides: The sulfates would likely damage the ozone layer shielding Earth from damaging ultraviolet rays; they don't stop atmospheric carbon dioxide from acidifying the oceans; and sudden cooling of the Earth would itself alter climate patterns in unknown ways.

"These scenarios create winners and losers," said Shepherd, lead author of a pivotal 2009 Royal Society study of geoengineering. "Who is going to decide?"

Many here worried that someone, some group, some government would decide on its own to conduct large-scale atmospheric experiments, raising global concerns - and resentment if it's the U.S. that acts, since it has done the least among industrial nations to cut greenhouse emissions. They fear some in America might push for going straight to "Plan B," rather than doing the hard work of emissions reductions.

In addition, "one of the challenges is identifying intentions, one of which could be offensive military use," said Indian development specialist Arunabha Ghosh.

Experts point out, for example, that cloud experimentation or localized solar "dimming" could - intentionally or unintentionally - cause droughts or floods in neighboring areas, arousing suspicions and international disputes.

"In some plausible but unfortunate future you could have shooting wars between your country and mine over proposals on what to do on climate change,' said the University of Michigan's Ted Parson, an environmental policy expert.

The conferees worried, too, that a "geoengineering industrial complex" might emerge, pushing to profit from deployment of its technology. And

Australian economist-ethicist Clive Hamilton saw other go-it-alone threats - "cowboys" and "scientific heroes."

"I'm queasy about some billionaire with a messiah complex having a major role in geoengineering research," Hamilton said.

All discussions led to the central theme of how to oversee research.

Many environmentalists categorically oppose intentional fiddling with Earth's atmosphere, or at least insist that such important decisions rest in the hands of the U.N., since every nation on Earth has a stake in the skies above.

But at the meeting in March, Chicheley Hall experts largely assumed that a coalition of scientifically capable nations, led by the U.S. and Britain, would arise to organize "sunshade" or other engineering research, perhaps inviting China, India, Brazil and others to join in a G20-style "club" of major powers.

Then, the conferees said, an independent panel of experts would have to be formed to review the risks of proposed experiments, and give go-aheads - for research, not deployment, which would be a step awaiting fateful debates down the road.

Like Isaac Newton and Charles Darwin, John Shepherd is a fellow of the venerable Royal Society, but one facing a world those scientific pioneers could not have imagined.

"I am not enthusiastic about these ideas," Shepherd told his Chicheley Hall colleagues. But like many here he felt the world has no choice but to investigate. "You would have a risk-risk calculation to make."

Some are also making a political calculation.

If research shows the stratospheric pollutants would reverse global warming, unhappy people "would realize the alternative to reducing emissions is blocking out the sun," Hamilton observed. "We might never see blue sky again."

If, on the other hand, the results are negative, or the risks too high, and global warming's impact becomes increasingly obvious, people will see "you have no Plan B," said EDF's Hamburg - no alternative to slashing use of fossil fuels.

Either way, popular support should grow for cutting emissions.

At least that's the hope. But hope wasn't the order of the day in Chicheley Hall as Shepherd wrapped up his briefing and a troubled Odingo silenced the room.

"We have a lot of thinking to do," the Kenyan told the others. "I don't know how many of us can sleep well tonight."

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Citation: Tweaking the climate to save it: Who decides? (2011, April 3) retrieved 22 May 2024 from https://phys.org/news/2011-04-tweaking-climate.html

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