

The Right Climate for Assessment

As nations debate limits on greenhouse emissions, Robert Watson takes charge of the world's leading scientific program of climate change assessment. Can he make the IPCC work better?

Robert Watson's energetic approach to science is legendary. Once he flew from Washington, D.C., to Jakarta for lunch—just lunch—to release a report on biodiversity. Then there was his trip to Amsterdam. Arriving too late for breakfast, he gave a half-hour talk to an international meeting on changes in land use and left before lunch was served. For almost 20 years, Watson has traveled the United States and abroad nagging, cajoling, and prodding scientists into refining the way they reach consensus on a range of environmental issues—among them stratospheric ozone depletion, greenhouse warming, biodiversity, and sustainable development.

The aim of all this frenetic activity is to help policy-makers sort through the babel of conflicting scientific opinion on important policy issues. Working at NASA, the White House, and now the World Bank, Watson has helped convert the subtle global threat of ozone depletion into a model of scientific assessment and political response. He's injected an integrative approach to environmental problems at the White House, and he's begun to heighten environmental awareness at the World Bank, where he is now director of the environmental department. Next week, he also takes the helm of the biggest scientific assessment of them all, the Intergovernmental Panel on Climate Change (IPCC), as it embarks on its next major report.

The post puts Watson smack in the middle of one of the hottest scientific debates of all—a debate in which IPCC has already played an influential role. Its 1995 report, which pointed to signs of a human-induced “discernible change” in global climate, was a key input into a political process that will culminate in December, when representatives of more than 160 nations will meet in Kyoto, Japan, to adopt a binding agreement on greenhouse-gas emissions. IPCC's next report, due in 2000, will try to refine the scientific consensus further, pushing assessments toward the edge of—but not into—policy-making. It's an

enormous job, but one that plays to his strengths as a hard-driving, consensus-building science manager.

The IPCC has its roots in the early days of assessing the cause and likely extent of ozone depletion. Nine years after its creation by the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO), it has evolved into an exercise involving 2500 scientists around the globe. Every 5 years, a 3-year effort culminates in three major reports—on the science of climate change, its impacts, and possible responses. Each report consists of about a dozen chapters put to-

which many trillions of dollars in economic activity may turn, is unassailable “transparency and credibility.”

Who do you trust?

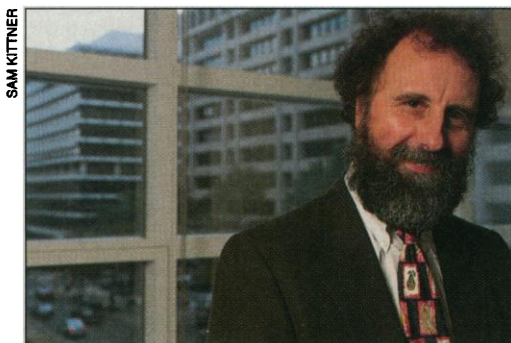
Like the IPCC, Watson got his start when stratospheric ozone depletion was still a theoretical threat. His Ph.D. from London University in 1973 was on the gas-phase kinetics of chlorine, bromine, and fluorine, the very chemistry that within a couple of years would become central to the ozone controversy. But Watson admits he “did all this work without a clue it had any relevance to the atmosphere.” A series of post-

doc positions soon introduced him to the social relevance of gas-phase chemistry, and 5 years at the Jet Propulsion Laboratory in Pasadena, California, involved him in the evaluation of laboratory kinetics data for modeling atmospheric chemical processes. The experience, he says wryly, taught him

the process of figuring out “which of these 23 papers do you trust?”

Arriving at NASA headquarters in 1980 as program scientist for the Upper Atmosphere Research Program, Watson found the overall assessment of ozone science to be just as fragmented. In a 2-year period, at least five major assessments were carried out—by the U.S. National Academy of Sciences, NASA, the European Union, UNEP, and the British government. Watson was bewildered: “I said, ‘This is ridiculous.’ Both the scientists and the policy-makers were looking at the differences between the reports instead of the similarities. Policy-making was already complicated enough; we realized we needed an international umbrella.” By 1981, Watson had brought in the WMO, and eventually the series of international ozone reports—which continues today—was co-sponsored by the two major international environmental organizations—UNEP and WMO.

Watson's take-home lesson from his ozone days is simple: “I believe the [international] IPCC process is much, much more powerful than the single-agency approach. The most important thing when you have an assessment



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gether by lead authors from around the world. The authors draw on scores of equally international contributors and incorporate comments from hundreds of reviewer scientists. The first two reports came out in 1990 and 1995, and the next cycle is just beginning. Watson assumes the chair from Bert Bolin, professor emeritus in meteorology at Stockholm University in Sweden.

Watson faces the job of defending and fine-tuning a process that some scientists view as already near perfection—but a few regard as fatally flawed. “The IPCC is a grand experiment,” says atmospheric scientist Michael Oppenheimer of the Environmental Defense Fund in New York City. “It's a tough question: How do you provide a process that draws technical conclusions and is completely faithful to the science, but is still usable by governments? There is no simple answer.”

The exhaustive and exhausting process has had its critics lately, prompting Watson to offer that “if there's any perception it's not the best, we're going to change it.” His goal for the climate assessment project, on

Integrating the diverse scientific viewpoints involved in discussing climate change should come naturally to Watson. It's been central to his whole career. He worked every angle of the ozone problem as a program manager at NASA, a leader in international assessment, and a scientific adviser to U.S. negotiators, says policy analyst Henry Lambricht of Syracuse

Right man for the job

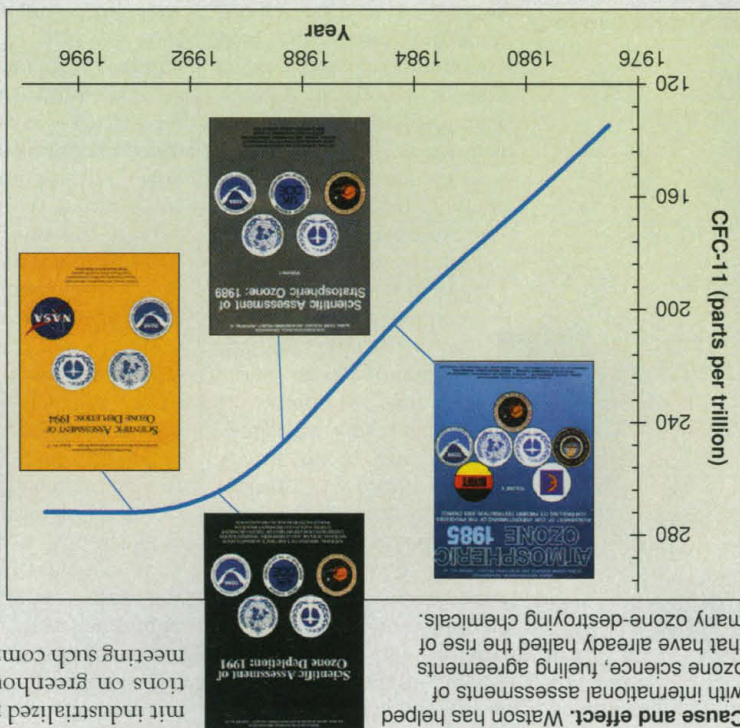
that, but he admits that the working group on options needs some restructuring, in particular to integrate the technology, economics, and social science of responding to climate change. more balanced than Watson thinks he is [missions] targets." on setting binding He seems to be hung up thinks about it, either. I'm not sure Bob Watson thinking about that, and don't think people are done," says a scientist in- things that could be "There's a whole lot of too narrow a view. that Watson may take emission limits suspect even those who favor climate change rather emphasized on adapting to ceived. Some want more has not been well re- group III, so far its work cus of IPCC's working meeting such commitments has been the fo-

While tions on greenhouse-gas emissions. While- mit industrialized nations to binding limita- will consider an agreement that would com- greenhouse warming, negotiators at Kyoto consensus on the exact magnitude of future Although IPCC itself has reached no easily blow off comments they don't like."

Watson hopes another change—the in- section of independent "editors" into the re- view process—will fend off charges of clubbish behavior. Although lead authors were required to document why they incor- porated or rejected each comment from re- viewers, theirs was the sole authority. "That oversight process probably was not ad- equate," says Kevin Trenberth of the Na- tional Center for Atmospheric Research in Boulder, himself a lead author in the last report. In the next round, Watson plans to use editorial boards whose members would intervene between chapter lead authors and reviewers "so no one can say the authors can't easily blow off comments they don't like."

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was a review of changes mandated by those at meet a tight deadline, and what was sacrificed between a working group meeting and a ple- Rather, he says, the typical 6-week interval but he says "there was a lot of smoke and very Watson admits that IPCC erred in that case, some discussions of the uncertainties in- that the lead author of one chapter dropped Washington, D.C.-based Science and Envi- sentatives. Critics like S. Fred Singer of the



review by colleagues and government repre- IPCC altered its 1995 report after its final complaints by greenhouse skeptics that the openness of the IPCC process and address Watson plans several changes to increase the fair sampling of the best and the brightest, While defending the IPCC participants as in its early iterations to people who had, in fact, been specifically excluded."

One of the IPCC's biggest problems, says Michaels, is the disproportionate number of government laboratory scientists with the travel funds and the time away from aca- demic responsibilities to participate in IPCC's intensive and often far-flung gather- ings. Participants also tend to be from orga- nizations "whose budgets are predicated on plans to go farther. "I believe industry and business and environmental NGOs [nongov- ernmental organizations] have to be abso- lutely and fully mainstream and integrated into IPCC," he says. "It has to be a very inclusive process. [An assessment] shouldn't be one view of the world."

report and perhaps beyond. In spite of IPCC's efforts to include diverse opinions in developing this consensus, some critics have complained that it has given short shrift to minority opinions and fostered an exclusiveness that tends to ensnare conven- tional thinking. One of the most visible critics of the IPCC process and product is climatolo- gist Patrick Michaels of the University of Vir- ginia in Charlottesville, who sees no prospect of disastrous climate change.

For global warming, the reality in CFC concentrations (see graph). tion and then to a detectable decline protocols that have led to a stabliza- lem, and the result was a series of options for ameliorating the prob- discussion then shifted to weighing chlorofluorocarbons (CFCs). The Antarctic ozone hole and pollutant ozone and a clear link between the detected a global downward trend in ozone science, fueling agreements that have already halted the rise of many ozone-destroying chemicals.

start is credibility. In the first phase of an environmental problem, says Daniel Al- britton of the National Oceanic and Atmo- spheric Administration's (NOAA's) Aer- onomy Laboratory in Boulder, Colorado, who with Watson has been a science adviser to U.S. ozone and climate negotiators, scien- tists must focus on the question: "Is this issue for real?" Ozone researchers could answer the question authorita- tively in the mid-1980s after they detected a global downward trend in ozone and a clear link between the Antarctic ozone hole and pollutant chlorofluorocarbons (CFCs). The discussion then shifted to weighing options for ameliorating the prob- lem, and the result was a series of protocols that have led to a stabliza- tion and then to a detectable decline in CFC concentrations (see graph).

IPCC had already targeted developing countries for greater inclusion, but Watson plans to go farther. "I believe industry and business and environmental NGOs [nongov- ernmental organizations] have to be abso- lutely and fully mainstream and integrated into IPCC," he says. "It has to be a very inclusive process. [An assessment] shouldn't be one view of the world."

process is that it has to be credible to all stake- holders. They may not all agree with the out- come, but if they're all part of designing the process in the beginning, they'll be more will- ing to let the chips fall where they may."

University in New York. Lambright calls Watson a "bureaucratic entrepreneur," someone who manages his part of the bureaucracy aggressively for a clear goal, in Watson's case to produce science that could create a consensus on ozone depletion. "He seized the moment," says Lambright. "He was a network builder. He traveled all over the place; he's a tremendously energetic guy, works hard, and is quite savvy. He pushed his position to the utmost; he was a catalyst for a much bigger process."

While pursuing the ozone problem at NASA, Watson "had the right issue and the right organization at the right time," says Lambright, who has studied the science-policy process of the time. But that may not have been the case when Watson went to the White House's Office of Science and Technology Policy (OSTP) as associate director for environment. There his efforts to coordinate federal agencies' response to the greenhouse problem, global change, and other environmental problems met with far less success.

With Watson's arrival, OSTP informed Congress that the new Clinton Administration "would go beyond basic research on the physical science issues [of global change] to societal and health issues," says Lambright. Watson "tried to move science into policy quickly, which was very entrepreneurial ... but people got upset with a White House figure telling agencies what to do."

Watson admits that his approach at OSTP didn't fly all that well, but "if I had to do it again, I would," he says. Watson feels that his assessment efforts at OSTP "went quite well." In areas as diverse as ozone depletion and oxygenated motor vehicle fuels, "the science input was welcome at the table" where consensus was hammered out.

Coordinating the science at federal agencies was another matter, however. "People may feel I pushed too far in trying to be holistic," says Watson. His holistic viewpoint on natural resources—integrating global warming, biodiversity, and toxins, for example—seemed to some researchers to be more like benign neglect of global warming (*Science*, 22 September 1995, p. 1665). And agencies were reluctant to spend the time needed to coordinate their activities if their budgets weren't rising, too.

As Watson takes on leadership of the biggest scientific assessment of all time, his former boss at NASA, Shelby Tilford of Orbital Sciences Corp. in Dulles, Virginia, hopes he will remain focused and energetic. "I think it's an enormous task," he cautions. "This is a much, much more complicated issue than CFCs. The whole process is going to be much more difficult. The main thing is for Bob to keep the scientific integrity without [the debate] becoming politicized too early. I wish him a lot of luck."

—Richard A. Kerr

MALARIA RESEARCH

South Wants Place at Table in New Collaborative Effort

HYDERABAD, INDIA—A new international initiative to combat malaria in Africa has triggered a mixed reaction from researchers in developing countries. While scientists on the front lines in the battle against malaria hail the prospect of additional funding for a disease that claims 3 million lives a year, many wonder if the Multilateral Initiative on Malaria (MIM) can deliver on its promise. At a global meeting on malaria research held here last month, leading researchers from the developing world warned that MIM can succeed only if it treats them as equal partners and tries to build up African science as well as promoting high-quality research.

The idea of a multilateral initiative was first publicly discussed at an international meeting of malaria scientists and public health experts held in January in Dakar, Senegal (*Science*, 17 January, p. 299). At last month's meeting here, officials from the U.S. National Institutes of Health (NIH), the World Health Organization (WHO), the World Bank, and the Wellcome Trust pledged \$2 million to get the project off the ground. In addition, NIH has committed another \$2 million for new initiatives in 1997, including creating a repository of malaria reagents for use by the global research community (*Science*, 29 August, p. 1207). "For the first time, officials from MIM have actually conveyed to the larger scientific community their enthusiasm and their commitment to a genuine partnership in malaria," noted Barend Mons, a senior adviser on international health research for the Medical Research Council of the Netherlands, at the Hyderabad meeting.

But getting this initial commitment may turn out to be the easy part. The \$2 million raised so far is paltry compared with the requests for funds that have poured in since MIM was announced (see sidebar). And even if MIM's sponsors do succeed in raising additional millions, forging the kinds of partnerships that will be needed to carry out the work will be tough. One major obstacle is the imbal-

ance in resources between North and South. That, in turn, can lead to a phenomenon that Win Kilama, director-general of the National Institute for Medical Research in Dar es Salaam, Tanzania, disparagingly calls "parachute science," in which Western scientists drop in to skim off results from local trials. Then there are the stumbling blocks within the developing world—excessive bureaucracy, meager funding, a poor infrastructure, and a shortage of trained native persons—that dilute the effectiveness of outside efforts.

Next month MIM will take the first step toward overcoming these problems when it convenes a panel to sort through "letters of interest" from researchers. The goal, says Tore



Crossing borders, saving lives. One successful, long-term collaboration between malaria researchers in the North and South involves Richard Carter of the University of Edinburgh, Peter David of the Pasteur Institute, and Kamini Mendis of the University of Colombo, Sri Lanka. At the same time, Tanzania's Andrew Kitua works on an African test of a synthetic vaccine.

Godal, director of WHO's special program for research and training in tropical diseases (TDR), is to "to promote, coordinate, and fund collaborative research in Africa" that will lead to "sustainable development of malaria research and control." Organizers say that it could be extended to other regions if the resources materialize.

Godal's language is intended to address two major concerns. The first, by European funding