

Sigma Xi Confronts Climate Change

In 2004, the United Nations Department of Economic and Social Affairs invited Sigma Xi, the Scientific Research Society, "to convene an international panel of scientists to prepare a report outlining the best measures for mitigating and adapting to global climate change." One reason for this charge was concern that "the United Nations' Millennium Development Goals (MDGs), which are the world community's blueprint for moving towards a sustainable, just world during this decade and beyond, are becoming more difficult to achieve as a result of human induced climate change." The resulting report on "Confronting Climate Change" was released at the New York Academy of Sciences on 27 February 2007. A description of the meeting with videos is available at the website of the Academy, www.nyas.org. (Go to "eBriefings, and search for "Confronting Climate Change".)

The first of the three chapters of the Sigma Xi report, on "Climate Change and Consequent Impacts," notes that the increasing concentration of carbon dioxide in Earth's atmosphere, coming in recent decades from "75% to 85% from fossil fuels . . . and 15% to 25% from deforestation and other landcover change," has already increased global-average surface temperature about 0.8°C above its level in 1750 and that a "further 0.4°C to 0.5°C rise in global-average surface temperature will take place as a result of the current atmospheric concentrations of greenhouse gases and particles." Moreover, "increases beyond 2.0°C to 2.5°C above the 1750 level will entail sharply rising risks of crossing a climate 'tipping point' that could lead to intolerable impacts on human well-being."

The last two chapters reflect the subtitle of the report: "Avoiding the Unmanageable and Managing the Unavoidable." Chapter Two, "Mitigation of Climate Change," makes recommendations to eliminate or reduce emissions of carbon dioxide and other greenhouse gases. Chapter Three, "Adaption to Climate Change," makes recommendations to cope with whatever climate change cannot be avoided.

The authors of the report also write that "We believe that these recommendations are consistent with the findings of the Intergovernmental Panel on Climate Change. . . ." But by imposing a maximum global average temperature of 2.5°C above that in 1750, coupled with an increase of 0.8°C thus far and 0.4°C to 0.5°C more to come from emissions that have already occurred, the Sigma Xi report allows for little more than one additional degree (Celsius) of global warming. This is same as the allowance that Hansen, *et al.* (see Reference #3, this issue) allow if catastrophic climate change is to be avoided -- and they claim that the IPCC are guilty of understatement about the dire consequences of greenhouse gases. Interestingly, Hansen's limitation of carbon dioxide atmospheric concentration to 450-475 ppm is consistent with what Hoffert, et al. (*Science*, **298**, 981-987 (1 Nov 02), described in both Spring 2005 and Winter 2004 issues) say "could be needed to forestall coral reef bleaching, thermohaline circulation shutdown, and sea level rise from the disintegration of the West Antarctic Sheet" and "could require Herculean effort."

Peter Raven chaired the Sigma Xi panel, and Rosina Bierbaum was its vice-chair. The other "coordinating lead authors" were John P. Holdren, Michael MacCracken, and Richard H. Moss.