Avoiding hazards of best-guess climate scenarios

SIR — Your Special Report "The costs of global warming" (*Nature* 439, 374–375; 2006) gives an unbalanced picture of the emissions scenarios developed by the Intergovernmental Panel on Climate Change (IPCC).

In contrast to the claim that these scenarios are outdated, a recent peer-reviewed assessment has concluded that, with a few notable exceptions, they compare reasonably well to recent data and projections for gross domestic product, population and emissions (D.v.V. and B.O'N. *Clim. Change*, in the press. doi: 10.1007/s10584-005-9031-0; see www.iiasa.ac.at/Research/PCC/pubs/vanVuuren&ONeill2006_CC_uncorproof.pdf).

Although we believe that progress on scenario development can and will be made, the elements of 'up-to-date' economic theory identified as overlooked — "how future societies will operate, how fast the population will grow, and how technological progress will change things" — are either too vague to be meaningful, or are issues the community has been dealing with for years. The Energy Modeling Forum has a 30-year history of model comparisons, exploring the implications for climate policy of a range of rates of economic growth and technological change (D. W. Gaskins and J. P. Weyant *Am. Econ. Rev.* 83, 318–323; 1993, and J. P. Weyant *Energy Econ.* 26, 501–515; 2004).

It is not correct to imply that the scenarios only use market exchange rates, or that they all assume that "the economies of poor countries will quickly catch up with those of rich nations". Some scenarios are also reported in terms of purchasing-power parity exchange rates in the original 2000 IPCC Special Report. The debate on the emissions impacts of alternative exchange rates in economic modelling is not conclusive, but such impacts are likely to be small compared with the influence of technology, lifestyle and climate policies. And in no scenario do developing countries become as affluent as industrialized ones.

The assumed degree of catching up in the scenarios covers a wide range of possibilities. Focusing on a small number of most-likely futures ignores lessons from history: if the world always worked according to best-guess projections, we would now be living with nuclear power too cheap to meter and no ozone hole.

Arnulf Grubler*†, Brian O'Neill*‡, Detlef van Vuuren§
*International Institute for Applied Systems Analysis, A-2361 Laxenburg, Austria
†School of Forestry & Environmental Studies, Yale University, New Haven, Connecticut 06511, USA
‡Watson Institute for International Studies, Brown University, Providence, Rhode Island 02912, USA
§Netherlands Environmental Assessment Agency, PO Box 303, 3720 BA Bilthoven, The Netherlands

Physician–scientists are needed now more than ever

SIR — Your News Feature "Them and us no longer" (*Nature* 439, 779–780; 2006), about the narrowing divide between medical doctors and PhD scientists, ends with a disturbing assumption: that "the era of the physician–scientist [is drawing] to a close". As medical doctors who have spent our careers in science, we strongly favour programmes that expose PhD researchers to the realities of clinical medicine. But these efforts do not eliminate the need for the classic physician–scientist, who obtains hands-on training in medicine as well as an advanced science education.

The recent rapid decline in the number of physician–scientist trainees in the United States and elsewhere is a serious problem that has been largely ignored. Now more than ever, we need them to continue bridging the intellectual and conceptual gap between medical doctors, seeking to understand the potential for science to deliver better care, and PhD researchers with an increasing interest in the same goals.

The disturbing trend in which fewer novel therapeutics are reaching the clinic will also not be halted without a robust pipeline of physician–scientists. Unless their training is restored, everyone stands to lose: medical doctors, academic researchers, taxpayers, funding organizations — and, most of all, patients. For further relevant literature, see http://meded.ucsd.edu/adpst/media_ps.html.

Ajit Varki
School of Medicine, University of California, San Diego, La Jolla, California 92039-0687, USA
Other signatories of this letter:
Edward Holmes *University of California, San Diego, USA*
Tadataka Yamada *GlaxoSmithKline, Pennsylvania, USA*
Peter Agre *Duke University School of Medicine, North Carolina, USA*
Sydney Brenner *The Salk Institute, San Diego, California, USA*

India's concern about both security and sea research

SIR — I share marine researchers' feelings about restrictions on carrying out research in Indian waters, as expressed in your News story "India's ban on foreign boats hinders tsunami research" (*Nature* 439, 380; 2006). But few countries allow foreign vessels into their 'territorial waters', 12 nautical miles from the coast, for research purposes. Foreign vessels are usually allowed into their exclusive economic zones, which lie between 12 and 200 nautical miles from shore.

France has made considerable efforts to develop a joint Indo-French research programme since the 2004 tsunami. Although strongly recommended by an Indian expert panel, the programme has not been pursued. However, India has sent scientists to participate in the 2005 French marine survey, and plans to send more in July and August 2006, as part of the Sumatra-Andaman Great Earthquake research initiative (www.ipgp.jussieu.fr/~singh/SAGER).

HMS Scott, a British Royal Navy vessel, did the first marine survey off the shore of Sumatra after the tsunami. But the international science community has so far had limited access to the collected data. One should not be surprised that India is concerned about security issues. Further, India has acquired a significant amount of marine data around the Andaman–Nicobar region, both before and after the tsunami. If India develops its own marine research programme, efforts should be made to integrate these data with others recently acquired in the Indonesian waters.

Satish Singh
Laboratoire de Géosciences Marines, Institut de Physique du Globe de Paris, 4 Place Jussieu, 75252 Paris Cedex 05, France

Tools needed to navigate landscape of the genome

SIR — I enjoyed your News Feature "The web-wide world" (*Nature* 439, 776–778; 2006), highlighting the impact of Google Earth on the scientific community. The success of this program underscores the importance of open standards for data and easy interoperation between information resources.

To some degree, the same success has been achieved in the macromolecular-structure world, where visualization tools allow users to 'fly through' macromolecules in 3D, and add layers of information to them. The first of these was Alywn Jones's Frodo (T. A. Jones *J. Appl. Crystallogr.* 11, 268–272; 1978), which inspired a generation of structural biologists. It was followed by a plethora of programs including O, Midas, Chime, Rasmol, VMD and PyMOL (see www.umass.edu/microbio/rasmol/history.htm). Many of these require only modest computing resources, and information such as mutation patterns can be easily superposed onto a structure of interest.

A good visualization program and open 'browsing' system can catalyse a lot of interesting science. I urge the development of comparable, free browsers for other emerging areas in the biological sciences: in particular, for visualizing the vast landscape of the genome and for navigating through complex biological networks.

Mark Gerstein
Molecular Biophysics and Biochemistry, and Computer Science, Yale University, PO Box 208114, New Haven, Connecticut 06520-8114, USA

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