



LETTERS

edited by Jennifer Sills

Food for Thought on Climate Policy

IN THEIR POLICY FORUM "LINKING POLICY ON CLIMATE AND FOOD" (25 February, p. 1013), H. C. J. Godfray *et al.* argue that climate change negotiations must integrate policy to address both climate change and food insecurity. I would like to add two points.

First, avoidable transcontinental food trade should be minimized. For example, the U.S. aquaculture industry currently meets only 5 to 7% of domestic demand for seafood; the transportation required to import additional seafood has a substantial indirect CO₂ footprint (1). Agricultural policies should encourage sustainable local food production in an effort to reduce CO₂ emissions. A study that compared CO₂ emissions from the conventional long-distance import system with the emissions from Iowa-based regional and local systems found that the conventional system released between 5 and 17 times more CO₂ from the burning of fuel than did the regional and local systems (2). Similarly, rather than shipping food to underdeveloped nations, developed nations should leverage agricultural technologies and agricultural infrastructure investment to improve local food production.

Second, we must make use of food and feed ingredients in the byproducts of the growing biofuel sector (1). It is estimated that 100 million tons of proteins will be produced as coproducts of biofuel

Food transport. Is there a more climate-friendly approach?

biomass (3). Given that protein energy malnutrition is a leading cause of deaths of children in famine-stricken underdeveloped countries (4), the high-quality protein from biofuel industries (such as algae, cellulose, and lignocellulose) should be used as food (5). **BOBBAN G. SUBHADRA**

Department of Internal Medicine, School of Medicine, University of New Mexico, Albuquerque, NM 87131, USA. E-mail: BSubhadra@salud.unm.edu

References

1. B. G. Subhadra, Grinson-George, *J. Sci. Fd. Agric.* **91**, 2 (2011).
2. R. Pirog *et al.*, "Food, Fuel, and Freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions" (Leopold Center for Sustainable Agriculture, Iowa State University, Ames, IA, 2001); www.leopold.iastate.edu/pubs/staff/ppp/.
3. J. Van Haveren *et al.*, *Biofuel Bioprod. Biorefin.* **2**, 41 (2008).
4. T. von Schoen-Angere *et al.*, *Lancet* **371**, 1748 (2008).
5. B. G. Subhadra, *Energ. Pol.* **38**, 5892 (2010).

AIDS Prevention Plans
Must Reflect Local Values

IN HIS NEWS STORY "NO OPIATE SUBSTITUTES for the masses of IDVs" (special section on HIV/AIDS in Europe, 9 July 2010, p. 165), J. Cohen summarized an interview with me as follows: "Alexey Mazus, head of the city-sponsored Moscow Centre for HIV/AIDS Prevention and Treatment, articulates the government position—which he shares—and makes it clear that he strongly objects to other countries criticizing his country's stance toward harm reduction. 'It's not their business what's going on in the Russian Federation,' says Mazus." I would like to emphasize that I was expressing my personal opinion and that I am not in an official capacity to articulate the government position. Moreover, this quote misrepresents my views. Contrary to what was ascribed to me, I think that the global AIDS epidemic in general and epi-

demics in any particular country, including Russia, are everybody's business and that the response to those epidemics should be discussed, praised, and criticized.

However, it is true that I strongly disagree with the idea that prevention programs must be consistent across countries. Local circumstances, ethics, and cultural values must be taken into account, as was stated in the Declaration of the 2006 UN General Assembly special session on HIV/AIDS. In my opinion, harm reduction measures cannot be effective in Russia, and I cannot agree with the pressure on Russia to adopt this program based on the fact that it was effective in some other countries. In this case, my opinion coincides with the Russian state policy, but I speak only as an expert on HIV and AIDS epidemics in Russia.

ALEXEY MAZUS

Moscow AIDS Center, 105275 Moscow, Russia. E-mail: aids@spid.ru

NSF Program Benefits
Schools in Need

WE ARE AMONG THE MANY SCIENTISTS "shocked and upset" by the recent decision by the U.S. National Science Foundation (NSF) to terminate the successful GK-12 (Graduate Science, Technology, Engineering, and Mathematics Fellows in K-12 Education) program ("Outrage greets NSF decision to end STEM Fellows program," J. Mervis, *News & Analysis*, 4 March, p. 1127). Our use of these funds provides one example of the program's value.

Our program deploys graduate student Fellows to rural Oregon elementary schools, where they live as scientists-in-residence with hosts for 2 weeks per academic quarter, during which they co-teach children alongside teachers, implementing professionally developed inquiry-based science curriculum kits (lesson plans, materials, and equipment).



Learn how current events are impacting your work.

ScienceInsider, the new policy blog from the journal ***Science***, is your source for breaking news and instant analysis from the nexus of politics and science.

Produced by an international team of science journalists, *ScienceInsider* offers hard-hitting coverage on a range of issues including climate change, bioterrorism, research funding, and more.

Before research happens at the bench, science policy is formulated in the halls of government. Make sure you understand how current events are impacting your work. Read *ScienceInsider* today.

www.ScienceInsider.org

*Science***Insider**

Breaking news and analysis from the world of science policy



Because these schools are far from universities and other centers of science or technology, the GK-12 Fellows are in many cases the only scientists the students have ever met. The teachers also have poor connections to experts and have little prior training in teaching hands-on, inquiry-based science; working with Fellows is crucial for adopting tools that will be effective after the Fellows' departure. The program benefits the Fellows by providing valuable training in communication and organization.

Ours is just one of many GK-12 programs nationwide that share the goal of improving science education. We find it remarkable that the entirety of GK-12 will be terminated, with focus redirected to "NSF programs that... partner academic scientists with local school districts." The local environs of universities are arguably the places least in need of additional outreach efforts.

The publicly funded U.S. research infrastructure has been extremely successful in advancing scientific knowledge, but largely unsuccessful in developing a public understanding of science. The nation needs more, not fewer, programs like GK-12.

RAGHUVeer PARTHASARATHY,*

DEAN LIVELYBROOKS, DAVID JOHNSON,
CATHERINE PAGE, SHANNON BOETTCHER,

J. DAVID COHEN, ERIC CORWIN, MIRIAM DEUTSCH,
MICHAEL HALEY, ROGER HAYDOCK, SHIH-YUAN LIU,
MARK LONERGAN, GEORGE NAZIN,
RICHARD TAYLOR, DAVID TYLER, HAILIN WANG

Departments of Chemistry and Physics, The University of Oregon, Eugene, OR 97403, USA.

*To whom correspondence should be addressed. E-mail: raghu@uoregon.edu

Drug Regulatory Systems Must Foster Innovation

WE SUPPORT M. A. HAMBURG'S PLEA FOR increased funding of regulatory science ("Advancing regulatory science," Editorial, 25 February, p. 987). We also share her ambition to modernize the regulatory system and bring 21st-century science and technology to drug development and drug evaluations.

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the past 3 months or matters of general interest. Letters are not acknowledged upon receipt. Whether published in full or in part, Letters are subject to editing for clarity and space. Letters submitted, published, or posted elsewhere, in print or online, will be disqualified. To submit a Letter, go to www.submit2science.org.

In addition, regulatory science should evaluate and study regulatory systems in terms of their ability to ensure patient safety, enhance public health, and stimulate innovation (1–3). During the past decades, the introduction of new innovative drugs has dropped, despite impressive investments and progress in biomedical research and development. Although the reasons for this innovation deficit are not fully understood, many observers see the increasing demands of the regulatory systems as one of the main drivers.

HUUB SCHELLEKENS^{1,2*} ELLEN MOORS,²
H. G. LEUFKENS^{1,3}

¹Utrecht Institute for Pharmaceutical Sciences, Utrecht University, Utrecht, 3584 CA, Netherlands. ²Department of Innovation Studies, Utrecht University, Utrecht, 3584 CS, Netherlands. ³Dutch Medicines Evaluation Board, Kalvermarkt 53, 2511 CB, Den Haag, Netherlands.

*To whom correspondence should be addressed. E-mail: h.schellekens@uu.nl

References

1. T. J. Giezen *et al.*, *JAMA* **300**, 1887 (2008).
2. H. G. Eichler, F. Pignatti, B. Flamion, H. G. Leufkens, A. Breckenridge, *Nat. Rev. Drug Discov.* **7**, 818 (2008).
3. H. Schellekens, E. Moors, *Nat. Biotechnol.* **28**, 28 (2010).

Viability of GM Fungi Crucial to Malaria Control

IN THEIR REPORT “DEVELOPMENT OF TRANS-GENIC FUNGI THAT KILL HUMAN MALARIA PARASITES IN MOSQUITOES” (25 February, p. 1074), W. Fang *et al.* discuss a genetically modified (GM) fungus that removes *Plasmodium* parasites from infected mosquitoes and could thus reduce malaria transmission. Indeed, the transgene exclusively targets the causative agent of malignant malaria, *Plasmodium falciparum*. In light of emerging insecticide



resistance that may seriously undermine current malaria vector control efforts [including use of impregnated bednets and indoor residual spraying of insecticides (1, 2)], fungal biopesticides should be developed as viable and sustainable biological alternatives. However, the authors have not yet tested whether GM fungi remain as viable over time as non-GM fungi. This viability will determine the frequency with which these organisms need to be applied as a control tool and thus their eventual cost-effectiveness.

So far, no single, long-lasting delivery technology of fungal biopesticides for malaria control is available. The published GM technology will offer great opportunities to better understand and improve fungal properties, but we have not yet fully exploited the potential of nontransformed entomopathogenic fungi to reduce the burden of malaria.

CONSTANTIANUS J. M. KOENRAADT* AND
WILLEM TAKKEN

Laboratory of Entomology, Wageningen University, Droevendaalsesteeg 1, Wageningen, 6700 EH, Netherlands.

*To whom correspondence should be addressed. E-mail: sander.koenraadt@wur.nl

References

1. A. W. Yadouleton *et al.*, *Malaria J.* **9**, 83 (2010).
2. D. Yewhalaw *et al.*, *PloS ONE* **6**, e16066 (2011).

TECHNICAL COMMENT ABSTRACTS

Comment on “Calcareous Nannoplankton Response to Surface-Water Acidification Around Oceanic Anoxic Event 1a”

Samantha J. Gibbs, Stuart A. Robinson, Paul R. Bown, Tom Dunkley Jones, Jorijntje Henderiks

Erba *et al.* (Reports, 23 July 2010, p. 428) attributed calcareous nannofossil morphology and assemblage changes across Cretaceous Oceanic Anoxic Event 1a to the effects of surface ocean acidification. We argue that the quality of carbonate preservation in these sequences, the unsupported assumptions of the biotic response to acidity, and the absence of independent proxy estimates for ocean pH or atmospheric $p\text{CO}_2$ render this conclusion questionable. Full text at www.sciencemag.org/cgi/content/full/332/6026/175-b

Response to Comment on “Calcareous Nannoplankton Response to Surface-Water Acidification Around Oceanic Anoxic Event 1a”

Elisabetta Erba, Cinzia Bottini, Helmut J. Weissert, Christina E. Keller

Gibbs *et al.* question our reconstruction of surface- and deep-water acidification around Oceanic Anoxic Event 1a. We answer their criticisms to better substantiate our arguments and original conclusions. Contrary to their suggestion, preservation cannot explain the nannofossil changes we documented, which trace perturbations in the photic zone, including a substantial increase in partial pressure of CO_2 ($p\text{CO}_2$) and an inferred decreased pH as derived from geochemical proxies. Full text at www.sciencemag.org/cgi/content/full/332/6026/175-c

CREDIT: JIM GATHANY/CDC

Drug Regulatory Systems Must Foster Innovation

Huub Schellekens, Ellen Moors and H. G. Leufkens

Science **332** (6026), 174-175.
DOI: 10.1126/science.332.6026.174

ARTICLE TOOLS

<http://science.sciencemag.org/content/332/6026/174>

RELATED CONTENT

<http://science.sciencemag.org/content/sci/331/6020/987.full>

REFERENCES

This article cites 3 articles, 0 of which you can access for free
<http://science.sciencemag.org/content/332/6026/174#BIBL>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2011, American Association for the Advancement of Science