LETTERS

edited by Jennifer Sills

Amazon Science Needs Brazilian Leadership

A. REGALADO'S NEWS FOCUS STORY "BRAZILIAN SCIENCE: RIDING A GUSHER" (3 DECEMBER 2010, p. 1306) rightly highlights the "dearth of Brazilian-led science" in the Amazon and the "very delicate question" of Brazil's dependence on foreign knowledge production.

However, based on my experience and publication statistics from the Large-Scale Biosphere-Atmosphere experiment in Amazonia (*1*), I would challenge the statement that the "majority of publications on the Amazon don't have a Brazilian author." In fact, many papers have Brazilian co-authors. Brazilians (and Amazonian researchers) are involved in the majority of Amazonian research projects, but often in a subsidiary role as data providers and field workers rather than leading the research and developing the scientific arguments.

Research in Brazil. Many Amazon projects are led by foreign researchers.

Clearly, foreign researchers, resources, technology, and expertise have been instrumental in developing Amazonian science and raising Brazilian capacity in this biologically unique and important part of world. However, Brazilian researchers need to stop gratefully receiving fish and quickly learn how to use the rod and the line.

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Reference

1. Ministério de Ciência e Tecnologia, Programa de Grande Escala da Biosfera-Atmosfera na Amazônia (http://lba.inpa.gov.br/lba/) [in Portuguese].

Boosting CITES Through Research

IN THEIR POLICY FORUM "BOOSTING CITES" (24 December 2010, p. 1752), J. Phelps *et al.* propose improvements to the implementation of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). Most of their recommendations would involve the negotiation of cross-Party agreements and procurement of additional financial resources, both of which are likely to delay or prevent their implementation. We suggest a more straightforward improvement to CITES implementation: Scientists should consider choosing CITES-listed taxa as model taxa for their research.

At a workshop in 2008, more than 100 scientists and regulators compiled 60 case studies covering a wide range of CITES-listed taxa. The group outlined how information on the biology, harvesting, and management could be used to determine whether international trade in CITES-listed taxa is detrimental to their survival in the wild. Most of those case studies (78%) mentioned that more basic information on the biology of the taxa in the wild (including taxonomy, biology, and ecology) would improve their ability to make this determination (*1*).

A lot of scientific research is done on species that are chosen out of convenience. We recommend that, all else being equal, scientists coordinate with national scientific authorities, local communities, and commercial traders to work on CITES-listed taxa instead. Such research could directly address sustainable exploitation practices or could simply aim to generate relevant information as a by-product (for example, by generating additional information on the basic taxonomy, biology, and ecology of taxa). Either way, those implementing CITES would benefit from the additional information and scientists would achieve additional impact from their research.

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Reference

1. M. J. Smith *et al.*, *Biol. Conserv.* **144**, 82 (2011).

Response

WE AGREE WITH SMITH *ET AL.* THAT BASIC BIOlogical information is the cornerstone of CITES effectiveness and sustainable resource management, and that scientists should be encouraged to select CITES-listed species as research taxa. However, many of the most important and delicate issues for CITES go far beyond biology of species under threat. Biological data provide a critical, lowest common denominator for CITES decision-making, but strengthening CITES funding, checks and balances, analyses, and accompanying human institutions and capacities are equally critical to conservation.

Smith *et al.* suggest that collecting biological research would be a more straightforward approach to improving CITES implementation than our solutions, many of which would require substantial financial support and political will. In fact, even issues of basic biological research on vulnerable species are about Party funding, negotiations, safeguards, and collaboration. Bridging the logistical, financial, political, and permit-laden gulf to attract significantly more researchers to study these vulnerable species is not a simple process.

For example, obtaining research permits for work on CITES-listed or locally threatened (e.g., Red List) species is time-

consuming and expensive. A streamlined research permit process could facilitate this type of research. Furthermore, studying species with cross-border distributions and trade requires inter-Party collaboration and support; only with this coordination can researchers make efficient use of limited financial resources. Whereas many policy-makers seek quality data to support sustainable harvests, those research findings that could lead to increased regulations, monitoring, and management requirements may be viewed as increasing burdens on Party governments. Furthermore, improving wildlife harvest and trade data, a necessary supplement to data on sustainable use, will rely on increased Party funding, strengthened institutions, improved capacity, and greater collaboration. Increasing biological research cannot take place without these related changes. Perhaps one of the best ways to help researchers, CITES policy-makers, and customs agents to increase research collaborations would be to identify the needs of all stakeholders and improve communication among them.

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Engage Students in Education Reform

AS A SENIOR UNDERGRADUATE STUDENT AT a large public research university, I agree with W. A. Anderson *et al*. that excellent teaching and research are not mutually exclusive pursuits ("Changing the culture of science education at research universities," Education Forum, 14 January, p. 152). However, engagement with the students themselves is nowhere to be found in

the authors' seven initiatives. Students—the largest stakeholders in the current landscape of science education reform—should be added to the list of chairs, deans, and presidents as parties to engage in the policy debate (initiative 7). Such an addition would add a fresh perspective on the issue, open valuable communication pipelines between students and policy-makers, and provide opportunities for students interested in educational policy to gain experience in the field. Restructuring the culture of education at research universities will require a new paradigm: Students should be considered not as passive consumers but as active participants in their education.

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Response

WE AGREE THAT STUDENTS SHOULD BE ACTIVE participants in their own education, and we have indeed made changes to programs at both of our own institutions based on student feedback from anonymous course evaluations. For example, several years ago one of us (D.O.) began experimenting with in-class demonstrations using large objects to illustrate dynamic microscopic biological processes. Feedback indicated that students felt demonstrations were more useful than any other tools we used, including iClickers and animations, for understanding the course material. Guided by student feedback, we refined existing demonstrations and continue to develop new demonstrations each year (*1*). We maintain a Web site with video clips of demonstrations, some with additional instructions for faculty, to promote the use of this type of teaching tool both at our own institutions and more broadly (*2*). We thank Torchia for calling attention to this important aspect of the educational policy debate.

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1. D. K. O'Dowd, N. Aguilar-Roca, *CBE-Life Sci. Educ.* **8**, 118 (2009).
2. Bridging the Divide Between Research and Teaching, Biological Demonstrations (www.researchandteaching.bio.uci.edu/lecture_demo.html).

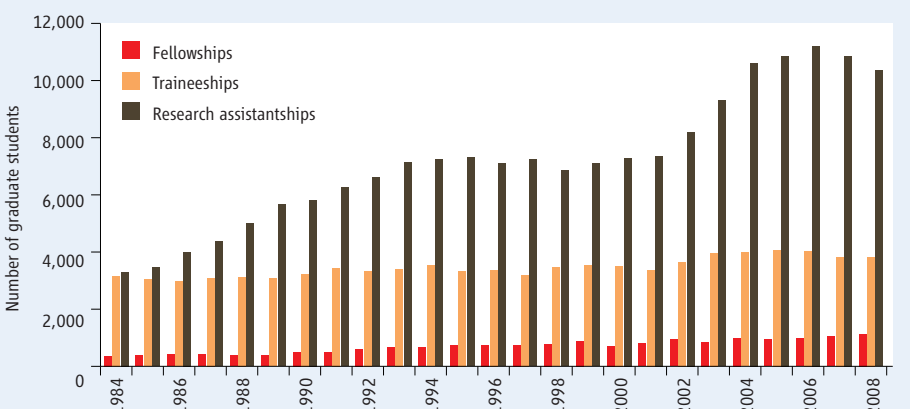
Letters to the Editor

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.

CORRECTIONS AND CLARIFICATIONS

News and Analysis: "NIH report urges greater emphasis on training for all graduate students" by J. Mervis (4 February, p. 525). Two bars were mislabeled in the graph showing modes of support for graduate students. The labels for fellowships and research assistantships were reversed. The correctly labeled graph appears here. Also, the comments attributed to Carolyn Bertozzi regarding the pressures on today's graduate students actually were expressed by another council member and HHMI investigator, Karolin Luger of Colorado State University. Luger was speaking about high-performing students who are repelled by the cut-throat atmosphere within a laboratory and choose to leave research altogether.

Training the Next Generation



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