LETTERS

Edited by **Jennifer Sills**

One Medicine One Science and policy

TODAY, HUMANS, ANIMALS, and the environment are remarkably interconnected and interdependent at a global level through international commerce and movement. Thus, we have access to safe and nutritious food that fuels health, medicines and vaccines that protect us and our animals, and natural resources that support good living standards. However, conflicts arise as exponentially growing populations require more food, demand better living standards, and act to preserve the environment. How do we simultaneously produce more food, reduce disease, afford equitable living standards, and create an environment fit for humans, our animals, and wildlife? Science has played a critical role in finding solutions to many of these challenges, but difficult conflicts continue to emerge. For example, strategies that promote efficient production of food—such as concentrated farming systems, monoculture cropping, and chemical inputs of fertilizer, pesticides, and herbicides—have unintended consequences that threaten human, animal, and environmental health (*1*). A more integrated, holistic problem-solving approach informed by science is needed for development of public policies that address these complex problems.

A growing "one health" dialogue has focused on emerging disease surveillance, public health preparedness, and policy issues, with less attention being given to connecting these issues to the scientific foundations that underpin pathogen emergence, global health threats, food security, and environmental health. The imbalance has resulted in a compartmentalization of research and policy, sometimes diluting or compromising the efficacy of the one health movement. For example, lack of balanced scientific input imperils policies affecting antibiotic use for efficient food production and, more seriously, modification of plants for improved production of foods under adverse conditions in impoverished countries. There is value in looking back at instances of scientifically informed decision-making that have broadly benefited human, animal, and environmental health, such as the U.S. Clean Air Act of 1970 and the U.S. Clean Water Act of 1972.

Human health security today relies on finding common ground at the intersection of humans, animals, and the environment among diverse opinions and values. The concept of One Medicine One Science–based forums that bring together a diversity of scientists, policy professionals, medical experts, food producers, and other relevant stakeholders provides an important opportunity to present scientific knowledge that objectively informs public policy development (*2*). In the absence of scientific information, for instance, concerns about foods genetically modified for enhanced traits have resulted in European markets being closed to African farmers trying to better their standard of living. It has also led to at-risk pregnant women and children lacking access to golden rice, whose high vitamin A content could alleviate as many as 500,000 cases of irreversible blindness in pregnant women and children every year (*3*). Scientifically informed public policies are also needed to find solutions to foreseeable food supply limitations, prepare for existing foreign animal and human disease pathogens (e.g., African swine fever virus and Chikungunya virus), and deal with environmental implications of extreme energy production (e.g., fracking effects on water quality) or industrial pollution of agricultural land in China (*4*). Overall, balancing competing priorities is a major challenge as societies seek to maximize human health, animal health and welfare, and environmental integrity. Reductionism may be a natural reaction to complexity, but we are in need of evolving ways to discuss, understand, and address these complex challenges.

Strategies to increase food production, such as pesticide use, have unintended consequences.

PHOTO: LENS/GETTY IMAGES

P. Sriramarao,[1]* Michael P. Murtaugh,[2] Kavita Berger,[3] Dominic Travis,[4] Shaun Kennedy,[4,5] Clifford J. Steer,[6] Carol Cardona[2]

[1]College of Veterinary Medicine, University of Minnesota, Saint Paul, MN 55108, USA. [2]Department of Veterinary and Biomedical Sciences, College of Veterinary Medicine, University of Minnesota, Saint Paul, MN 55108, USA. [3]Center for Science, Technology, and Security Policy, American Association for the Advancement of Science, Washington, DC 20005, USA. [4]Department of Veterinary Population Medicine, College of Veterinary Medicine, University of Minnesota, Saint Paul, MN 55108, USA. [5]The Food System Institute, LLC. [6]Departments of Medicine and Genetics, Cell Biology, and Development, University of Minnesota Medical School, Minneapolis, MN 55455, USA.

*Corresponding author. E-mail: psrao@umn.edu

REFERENCES

1. R. S. DeFries, J. A. Foley, G. P. Asner, *Front. Ecol. Environ*. **2**, 249 (2004).
2. D. A. Travis *et al*., *Ann. N.Y. Acad. Sci*. **1334**, 26 (2014).
3. Golden Rice Project (www.goldenrice.org).
4. C. Larson, *Science* **343**, 1415 (2014).

Counting on small-scale fisheries

ON 10 JUNE 2014, the member States of the Food and Agriculture Organization of the United Nations (FAO) adopted the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (*1*) ("Guidelines").

To make these Guidelines effective, it is crucial that the FAO, governments, and civil society have access to data to help understand small-scale fisheries. Currently, catches from these fisheries are not collected separately, but are lumped in with industrial catches, even though they represent about one-quarter of global catches, and the majority of catches in many developing countries. To promote the transparency needed for good governance (*2*, *3*), the FAO ought to request from member countries a report of catch data that distinguishes between industrial and small-scale fisheries.

Many decades of debate have failed to produce one, agreed-upon definition of a "small-scale fishery," but the modest variations in definitions between countries do not preclude efforts to gather global statistics. Just as the Guidelines do not impose a single definition of small-scale fisheries, each of the FAO's member States could define their own small-scale fisheries, reflecting local realities.

These changes would help to highlight the importance of small-scale fisheries and may also help governments that still treat these fisheries as a solution to demographic pressure and rural landlessness (*4*) to focus instead on their inherent value.

Daniel Pauly[1] and Anthony Charles[2]*

[1]*Sea Around Us*, Fisheries Centre, University of British Columbia, Vancouver, BC V6T1Z4, Canada. [2]School of Business and School of the Environment, Saint Mary's University, Halifax, NS B3H3C3, Canada.

*Corresponding author. E-mail: tony.charles@smu.ca

REFERENCES

1. FAO, *Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication* (Food and Agriculture Organization of the United Nations, Rome, 2014).
2. A. Charles, *Maritime Stud.* **10**, 85 (2011).
3. A. Charles, *Land Tenure J.* **1**, 9 (2013).
4. D. Pauly, *Maritime Stud.* **4**, 7 (2006).

A defense of animal welfare accreditation

IN HIS PROVOCATIVE News article, "Animal welfare accreditation called into question," (29 August, p. 988), D. Grimm discusses an article published in the *Journal of Applied Animal Welfare Sciences* (JAAWS) (*1*) analyzing the effectiveness of the accreditation system run by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International. The article purports to demonstrate that institutions participating in AAALAC International's accreditation program had more U.S. Department of Agriculture (USDA)–Animal Care inspection "noncompliance items" (NCIs) than did non-accredited institutions. Grimm accurately reported my opinion that the article was not credible. My opinion is based not only on the JAAWS authors' affiliation with People for the Ethical Treatment of Animals (PETA), an organization devoted to stopping all research using animals, but also on the fact that the research was flawed.

I asked the authors to share their data set for independent analysis by AAALAC and others, but they refused. This refusal to share data fails to meet contemporary standards for the responsible conduct of research, and in itself renders the conclusions open to question. I appealed to the editors of JAAWS for assistance; however, they replied that they encourage authors to share their data, but they do not require it, in contrast to the policy of *Science* and other respected scientific publications.

To approximate the unavailable data, AAALAC International acquired a comparable data set of NCIs for one of the years analyzed in the JAAWS publication using the same search engine (*2*). Our review of these data (see Supplementary Materials) supported all the potential deficiencies in the JAAWS manuscript mentioned by me and others—including the NIH's Office of Laboratory Welfare—in Grimm's article. First, according to the Discussion section of the JAAWS paper (*1*), the authors improperly treat every NCI (or "violation," the term used by Grimm) equally, although NCIs exhibit a wide and unacceptable variability and may lack demonstrable relevance to animal care, health, or well-being outcomes. Second, the USDA designation of a licensed research animal facility does not correspond identically with the unit designation used by AAALAC in the accreditation program (*3*, *4*). This fact, and the fact that some AAALAC-accredited units are unlisted on AAALAC's public Web site, would have produced substantial data coding errors in this study. Finally, the population of non-accredited research animal facilities is vastly different in character than the population of AAALAC-accredited units. In general non-AAALAC programs are smaller in size and have narrower research missions, whereas the AAALAC-accredited programs include the largest U.S. institutions with broad research missions entailing complex and diverse animal research studies. In short, the JAAWS analysis was incapable of producing a meaningful comparison of AAALAC-accredited programs and non-accredited research animal facilities using NCIs.

The institutions and their scientists participating in AAALAC accreditation understand the stark dissimilarity between the AAALAC's performance-based, confidential, expert, peer-review accreditation program and the USDA–Animal Care regulatory inspection process. Unfortunately, Grimm's article brought wide and undeserved attention to a poorly designed and executed study. This is deeply disappointing to AAALAC International and the scientific community it serves.

Christian Newcomer

Executive Director, Association for Assessment and Accreditation of Laboratory Animal Care International, Frederick, MD 21703, USA. E-mail: cnewcomer@aaalac.org

REFERENCES

1. J. Goodman, A. Chandna, C. Borch, *J. Appl. Anim. Welfare Sci.* **18**, 82 (2015).
2. USDA Animal Care Information System Search Engine (2014); https://acissearch.aphis.usda.gov/LPASearch/faces/Warning.jspx.
3. AAALAC International, Rules of Accreditation, Section 1, Definitions, Accreditable Unit (www.aaalac.org/accreditation/rules.cfm).
4. Licensing and Registration under the Animal Welfare Act, Guidelines for Dealers, Exhibitors, Transporters and Researchers, Research Facilities (www.aphis.usda.gov/animal_welfare/downloads/aw/awlicreg.pdf).

SUPPLEMENTARY MATERIALS

www.sciencemag.org/content/347/6219/243/suppl/DC1
Table S1