LETTERS

edited by Jennifer Sills

Uniting Church and Science for Conservation

HUMANS HAVE BEEN CUTTING ETHIOPIAN FORESTS FOR FUEL AND AGRICULTURE FOR CENTURIES (*1*). Only about 35,000 fragments remain in the northern highlands, ranging in size from 3 to 300 hectares. These fragments escaped deforestation because of their religious and spiritual importance; they are protected by, and are an integral part of, the Ethiopian Orthodox Tewahido Church (*2*). Within each forest, an Orthodox priest and his disciples live, conduct services, and oversee its use. These forests are both a religious and a biodiversity sanctuary (*3*–*6*), and they provide local people with essential ecosystem services such as fresh water, shade, honey, pollinators, and spiritual value.

The church leadership views biodiversity conservation as one of its primary stewardships, but the lack of perimeter delineation of these forest fragments threatens their future. Presently, less than 4% of the original forest cover remains in the region (*7*, *8*), and the remaining forests continue to be encroached upon (*9*), in part because of population increases—Ethiopia had a population of 43 million in 1984 but almost 80 million by 2000 (*10*). These church forests are also threatened by foraging livestock that increase soil compaction, hindering seed germination and forest regeneration. Sadly, when a forest disappears, the priest, his disciples and others living in the area also leave.

Valued. A church forest stands out against barren surroundings.

With such precious few fragments remaining, Ethiopia faces a conservation crisis. Understanding the role that church forests play in the provision of ecosystem services is critical, particularly for soil conservation, fresh water protection, and carbon sequestration. To preserve these forests, and perhaps even expand them, we must take an immediate, aggressive, and multidisciplinary approach that includes all stakeholders. For example, biologists, social scientists, ethnographers, religious leaders, and local people must collaborate. We must work to understand the relationship between local peoples and the forest and empower them to protect it. More immediately, we must establish perimeters to prevent grazing and encourage the planting of local trees in the forest areas (*8*). By taking these steps, we can protect Ethiopia's forests from further decline.

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Growing Need for Agriculture Experts

ISSUES RELATED TO THE SAFETY AND SECURITY of our food supply top the news on a regular basis [e.g., (*1*, *2*)]. Yet the news media continue to undermine the entry of students into the study of agriculture (*3*, *4*).

Statistical data from the U.S. Department of Labor (*5*) and U.S. Department of Agriculture (*6*) indicate an expected growth in most agriculture-related fields, including inspectors, scientists, and veterinarians. The Bureau of Labor Statistics projects that over the next five years, there will be a 5% increase in the need for graduates in these disciplines, but a 10% decline in the number of students choosing these important programs as their career path (*7*). This means a shortfall of qualified workers in the areas where we need them most—horticulture, animal husbandry, food science, and climate change or environmental analysis. There are also growing opportunities in industries with activities linked to agriculture, such as transporting food, specialty processing (e.g., coffee brewing), addressing dietetic concerns, protecting animal welfare, and producing pet foods. The Bureau of Labor Statistics also suggests an 8% increase in the need for qualified, well-educated agriculture managers to keep pace with quickly advancing technological methods of farming across the United States and abroad, along with changes in regulations at all government levels (*7*).

The bottom line: Agriculture isn't dead. In fact, no other industry feeds the world's population, which could hit 9 billion by 2050 (*8*). The need for graduates in agriculture, horticulture, and animal science programs will be critical to finding ways of safely doubling food production in order to meet the demand of a growing population.

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Demography's Role in Sustainable Development

IN PREPARING FOR THE RIO+20 EARTH Summit, the world community must acknowledge that population trends interact strongly with economic development and environmental change at local and global levels. The International Institute for Applied Systems Analysis (IIASA) recently convened leading experts to consider how demographic factors promote or impede sustainable development. The panel concluded that human beings—their numbers, distribution, and characteristics—are at the center of concern for sustainable development (*1*). The evidence is clear that demographic differences fundamentally affect people's contribution to environmental burdens, their ability to participate in sustainable development, and their adaptability to a changing environment. The developmental challenges are by far the most significant where population growth and poverty are the highest, education is the lowest, and vulnerabilities to environmental change are the greatest. Within families, women and children are most vulnerable.

As members of this panel, we put forward five action implications: (i) Recognize that the numbers, characteristics, and behaviors of people are at the heart of sustainable development challenges and of their solutions. (ii) Identify subpopulations that contribute most to environmental degradation and those that are most vulnerable to its consequences. In poor countries especially, these subpopulations are readily identifiable according to age, gender, level of education, place of residence, and standard of living. (iii) Devise sustainable development policies to treat these subpopulations differently and appropriately, according to their demographic and behavioral characteristics. (iv) Facilitate the inevitable trend of increasing urbanization in ways that ensure that environmental hazards and vulnerabilities are under control. (v) Invest in human capital—people's education and health, including reproductive health—to slow population growth, accelerate the transition to green technologies, and improve people's adaptive capacity to environmental change.

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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 & Analysis: "New cystic fibrosis drug offers hope, at a price" by J. Kaiser (10 February, p. 645). Paul Negulescu is vice president of research at Vertex Pharmaceuticals, not vice president for discovery biology.

News of the Week: "Crafoord Prizes announced" (27 January, p. 385). In the description of the Green-Tao theorem, the phrase "by adding any integer progressively to a starting number" should have read "by adding some integer progressively to some starting number." The item also incorrectly characterized the Schrödinger equation studied by prizewinner Jean Bourgain. That differential equation, which is the basis for nonrelativistic quantum mechanics, is linear. Bourgain studied the more complicated nonlinear Schrödinger equation, which has applications in nonlinear optics, the study of water waves, and the physics of Bose-Einstein condensates.

News Focus: "Ferreting out the hidden cracks in the heart of a continent" by N. Lubick (27 January, p. 397). In the figure, the label "Cairo, Missouri" should read "Cairo, Illinois."

Research Articles: "EPOXI at comet Hartley 2" by M. F. A'Hearn *et al.* (17 June 2011, p. 1396). The Research Article mentioned a dramatic increase in the flux with the Medium Resolution Instrument (MRI) roughly 6 weeks before the encounter. This effect was most pronounced with the CN narrowband filter in place—as large as a factor of 8—while fluxes measured with the broad band CLEAR1 filter increased by about 50%. Because the sudden onset and long duration of the event was unlike any cometary outburst, it was dubbed a "CN anomaly." The authors have since found that the anomaly was caused by a small light leak that allowed some indirect sunlight to enter the instrument for solar elongations between 118° and 128°. Because of the design of the spacecraft and its instruments, observations at such large solar elongations are rarely made and were assumed out of range in designing the instrument, so the light leak had not previously been seen. No other data are affected by this instrumental artifact.

TECHNICAL COMMENT ABSTRACTS

Comment on "Lévy Walks Evolve Through Interaction Between Movement and Environmental Complexity"

Vincent A. A. Jansen, Alla Mashanova, Sergei Petrovskii

de Jager *et al.* (Reports, 24 June 2011, p. 1551) concluded that mussels Lévy walk. We confronted a larger model set with these data and found that mussels do not Lévy walk: Their movement is best described by a composite Brownian walk. This shows how model selection based on an impoverished set of candidate models can lead to incorrect inferences.

Full text at www.sciencemag.org/cgi/content/full/335/6071/918-c

Response to Comment on "Lévy Walks Evolve Through Interaction Between Movement and Environmental Complexity"

Monique de Jager, Franz J. Weissing, Peter M. J. Herman, Bart A. Nolet, Johan van de Koppel

We agree with Jansen *et al.* that a composite movement model provides a better statistical description of mussel movement than any simple movement strategy. This does not undermine the take-home message of our paper, which addresses the feedback between individual movement patterns and spatial complexity. Simple movement strategies provide more insight in the eco-evolutionary analysis and are therefore our model of choice.

Full text at www.sciencemag.org/cgi/content/full/335/6071/918-d

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