

# Academic Geography for Sustainability

BY GEORGE E. CLARK

**Sustainability science** reaches across many different disciplines, encompassing natural sciences, social sciences, and policy research—but the discipline of geography comes closest to tying it all together. Geography is a core discipline of sustainability science. Five of the 23 eminent scientists and policy analysts who coauthored the seminal 27 April 2001 *Science* article “Sustainability Science” (see an extended preprint at <http://www.hks.harvard.edu/sustsci/ists/docs/2000-33.pdf>) are geographers, including lead author Robert W. Kates (<http://sustsci.aaas.org/content.html?contentid=55>), Jill Jäger ([http://seri.at/documentupload/people\\_cv\\_pdf/cv\\_jill\\_jger\\_en.pdf](http://seri.at/documentupload/people_cv_pdf/cv_jill_jger_en.pdf)), Roger E. Kasperson (<http://www.clarku.edu/departments/geography/facultybio.cfm?id=68&progid=15&>), Akin Mabogunje (<http://sustsci.aaas.org/contenthtml?contentid=9>), and Timothy O’Riordan (<http://www.uea.ac.uk/env/people/facstaff/oriordant>). All five are or have been executive or contributing editors of *Environment*.

“Sustainability Science” served as the first articulation of its field following the National Research Council’s (NRC) 1999 call in *Our Common Journey* (which also benefitted from Kates’s leadership) for a concerted effort to bring science and technology to bear on sustainability ([http://www.nap.edu/catalog.php?record\\_id=9690#toc](http://www.nap.edu/catalog.php?record_id=9690#toc)). Geographers were also well represented among the authors of another key sustainability science publication, a special section of the 2003 *Proceedings of the National Academy of Sciences* ([http://www.pnas.org/cgi/collection/sus\\_devo](http://www.pnas.org/cgi/collection/sus_devo)).

The participation of so many geographers in these publications is remarkable given the comparative size of the discipline. According to the 2006 Survey of Earned Doctorates (<http://www.norc.org/NR/rdonlyres/C22A3F40-0BA2-4993-A6D3-5E65939EEDC3/0/06SRRevised.pdf>), academic institutions awarded 206 PhDs in geography, substantially less than the number of doctorates in geology/earth science (432), ecology (388), and physics (1,365)—the latter a field not primarily associated with sustainability science but well represented within its ranks.

The *Science* article identified several issues of central concern to the discipline of geography: understanding “the dynamic interactions between nature and society,” “long-term trends in environment and development,” and “the vulnerability or resilience of the nature-society system.” For nature-society studies in geography, see, for example, the research concentra-

tion at Clark University (<http://www.clarku.edu/departments/geography/nature.cfm>). Clark University geographers also have been key players in the study of long-term trends in environment and development: they hosted the interdisciplinary symposium, “Earth Transformed,” and helped write the comprehensive 1990 volume it yielded, *The Earth as Transformed by Human Action* (<http://www.worldcat.org/oclc/20294746>). For vulnerability, see the Hazards and Vulnerability Research Institute at the University of South Carolina, staffed almost entirely by geographers (<http://webra.cas.sc.edu/hvri>).

The ability to approach environmental and other problems from many perspectives at once is one of geography’s key strengths, but this very breadth makes it difficult to define. At its essence, geography is the study of natural and built environ-

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ments and the way people interact with those environments and across space with one another. One practical way to get a sense of the field is to look at its British advanced secondary school requirements (informally known as A-levels, <http://store.aqa.org.uk/qual/pdf/AQA-5031-6031-W-SP-09.PDF>). Among the subjects covered are water resources, climatic hazards, climate change, energy and life, population dynamics, settlement processes and patterns, economic activity, coastal processes and problems, landform processes and hazards, cold environments, resource management, and urban planning and management, all of which are integral to the study of sustainability and the environment.

The Advanced Placement (AP) program offered in many U.S. secondary schools treats geography somewhat differently than the British system. An environmental science AP exam ([http://www.collegeboard.com/prod\\_downloads/ap/students/envsci/ap-cd-envsci-0708.pdf](http://www.collegeboard.com/prod_downloads/ap/students/envsci/ap-cd-envsci-0708.pdf)) covers much of the physical science aspects of geography, often referred to as physical geography. A stand-alone exam on human geography ([http://www.collegeboard.com/prod\\_downloads/ap/students/humangeo/ap-cd-humangeo-0708.pdf](http://www.collegeboard.com/prod_downloads/ap/students/humangeo/ap-cd-humangeo-0708.pdf)) focuses on how peo-

ple interact with built environments and across space with each other. Human-environment geography, which pertains to human interactions with natural, environmental, and agricultural features and processes, is somewhat awkwardly divided between the two exams.

*Annals of the Association of American Geographers* (<http://www.informaworld.com/smpp/title~content=t788352614>) also helps elucidate the scope of the discipline. The journal of the primary organization of geography scholars and practitioners in the United States (the Association of American Geographers, AAG, <http://www.aag.org>), *Annals* divides geography into four sections: “environmental sciences,” “methods, models, and geographic information sciences” (GIS), “nature and society,” and “people, place, and region.” Despite these apparent divisions, each section features articles on environment and sustainability. For example, recent issues have covered wetlands in Belize in the environmental sciences section; a potential bird flu pandemic in the GIS section; irrigation and social institutions in India in “nature and society”; and urban poverty and immigration in “people, place, and region.” The AAG itself is subdivided into a number of regional bodies (<http://www.aag.org/regions/Regionmap.html>) and subject-driven specialty groups ([http://www.aag.org/sg/sg\\_display.cfm](http://www.aag.org/sg/sg_display.cfm)).

While the AAG is involved in geography education ([http://www.aag.org/Education/aag/edu\\_project\\_main.cfm](http://www.aag.org/Education/aag/edu_project_main.cfm)), the

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main organization for geography educators is the National Council for Geographic Education (NCGE, <http://www.ncge.org>). The NCGE covers all levels of education, from kindergarten to college, and includes professional education for teachers. The American Geographical Society (AGS, <http://www.amerigeog.org>) emphasizes links between scholars, practitioners, policymakers, and businesses. The AGS media center links to op-ed articles by geographers and connects media to geographers who are experts on current events. (The AAG performs similar services as well; see <http://www.aag.org/Press>.) The National Geographic Society (NGS, <http://www.nationalgeographic.com>), which targets a broader audience, is probably the best-known geographic organization worldwide. In addition to its superb popular magazine and video projects, NGS is a major player in geography education (<http://www.nationalgeographic.com/foundation> and <http://www.ngsednet.org>). The National Science Foundation’s Geography and Spatial Sciences program ([http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5410](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5410)) funds much of the geography research in the United States.

Internationally, geography is represented by the International Geographical Union (<http://www.igu-net.org>), and other asso-

ciations in English-speaking countries include the Royal Geographical Society/Institute of British Geographers (<http://www.rgs.org>), the Canadian Association of Geographers (<http://www.cag-acg.ca>), the Institute of Australian Geographers (<http://www.iag.org.au>), and the New Zealand Geographical Society (<http://www.nzgs.co.nz>).

It is possible to study geography at every level of the educational system, although geography education in U.S. public schools remains in flux pending the reauthorization of legislation by Congress. Currently, geography is the only “core academic subject” without dedicated funding through the *No Child Left Behind Act* (see <http://aag.org/nclb/nclb.pdf> and <http://www.ed.gov/policy/elsec/leg/esea02>). Although there are many undergraduate geography programs, a bachelor’s degree in geography is not typically required for admission to graduate school in geography. The AAG provides a print guide to geography graduate programs (see <http://www.worldcat.org/oclc/64387729> and <http://www.aag.org/Publications/Guide.html>), and Phds.org provides online resources for evaluating more than 140 master’s degree programs and more than 50 doctoral programs (<http://graduate-school.phds.org/masters/geography>). The NRC periodically ranks doctoral programs in all fields of study. The latest available rankings are sorely out of date (see the 1995 Assessment of Research Doctorate Programs link at <http://sites.nationalacademies.org/pga/Resdoc/index.htm>), although more are forthcoming.

Finally, given such a broad discipline, it helps to note a leading geographer’s far-reaching contributions to sustainability science. Gilbert F. White (<http://www.colorado.edu/hazards/gfw>) and his students laid much of the groundwork in the twentieth century for the discipline’s contributions to what has been called sustainability research in recent decades (see, for example, a memorial to White in *Sustainability: Science, Practice, & Policy*, <http://ejournal.nbiu.org/archives/vol2iss2/editorial.cohen.html>). White, who died in 2006 at age 94, first made his mark with a study of the human role in flood hazards and a related research program that was an essential step toward the creation of the National Flood Insurance Program. He later branched out into researching arid lands, environmental hazards (those in addition to floods), and water supply. His groundbreaking work on water supply in developing countries was a study of community water use in East Africa that was replicated (<http://www.ied.org/pubs/pdfs/9049IIED.pdf>) 30 years later in the same communities. In addition, the NRC chose him to serve on distinguished panel of 19 reviewers for the landmark report mentioned above, *Our Common Journey*. As an executive and contributing editor of *Environment* and the founding director of the Natural Hazards Center at the University of Colorado, White inspired a great deal of current research; the latter program’s excellent newsletter, *Natural Hazards Observer* (<http://www.colorado.edu/hazards/o>), documents such ongoing work and other research spanning the field.

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