



## Science, Environment and Development Group

The Science, Environment and Development (SED) Group conducts research and trains doctoral students on understanding what makes knowledge useful for policy and management activities. It focuses on discovering what sort of institutions and procedures can help link knowledge with action in the domain of development and the environment. Bill Clark and Nancy Dickson co-direct the Group that is based in the Center for International Development's Sustainability Science Program.

**Why an SED Group?** The SED Group focuses on training and nurturing the next generation of researchers interested in understanding the use of science, technology and knowledge more generally for promoting sustainable development. The Group functions as a "lab" of faculty, research staff, doctoral students, post-docs, and visitors who are working to understand human-environment interactions that promote development. The SED Group holds a weekly seminar to discuss ongoing research among its members. It provides members physical proximity to a peer group, logistic and financial support, and mentoring.

The SED Group's research goal is to make science and technology knowledge more useful for problem-solving and decision-support activities in the arena of human-environment systems. It currently focuses on two areas. The first is on knowledge systems for decision support, understanding how the choice of institutions and procedures for linking practitioners and experts influences knowledge production and its effects. The second is on sustainability science, an area encompassing use-inspired fundamental research on interactions between human and environmental systems.

**Knowledge systems for development:** What makes knowledge useful in public decision or policy contexts? Our work shows how that utility is enhanced to the extent that information and the systems that produce it are perceived to be simultaneously salient, credible, and legitimate by multiple relevant stakeholders. We are focusing on how "boundary organizations" that work at the interface of research and policy function as institutional mechanisms for producing such knowledge.

**Sustainability science:** "Sustainability science" is an emerging field of research dealing with interactions between social and natural systems. From its focus on use-inspired basic research, the field reaches out to embrace relevant scholarship both on the fundamental character of interactions among humans, their technologies, and the environment, and on the utilization of that knowledge to address urgent problems of economic development and environmental conservation.

**Research:** Research in the SED Group focuses on five related issues. (i) Our knowledge systems work compares the effectiveness of different systems of research, observations, assessment, and decision support that attempt to harness research and development work in support of problem-solving and decision-making activities. (ii) Our ecosystem services work looks at how effectiveness and fairness of payments for ecosystem service arrangements are shaped by the particular institutions and procedures that govern them. (iii) Our technology innovation and adaptation work examines the barriers to the implementation of sustainable technologies and the institutional interventions that overcome those barriers. (iv) Our indicators work examines how better to produce an integrated set of high-level indicators on economy, society, and the environment. (v) Our work on scientific assessments examines the role of organized efforts to bring scientific information to bear in shaping social responses to large-scale environmental change.



**Teaching:** SED faculty and fellows are actively engaged in teaching in Harvard's College, professional schools, and executive training programs. The Group is also active in developing case materials for more general use in training about science, environment and development.

**Outreach:** The SED Group has been active in building the field of sustainability science through numerous outreach activities. Efforts to further science-based, action-oriented initiatives for sustainability science include: the U.S. National Academies' Roundtable on Science and Technology for Sustainability, the Initiative on Science and Technology for Sustainability, and journal editorship of the *Proceedings of the National Academy of Sciences*, *Environment: Science and Policy for Sustainable Development*, and *Annual Review of Environment and Resources*.

### Selected publications:

- Clark, W.C. and L. Holliday, Roundtable on Science and Technology for Sustainability. 2006. *Linking Knowledge with Action for Sustainable Development: The Role of Program Management*. Washington, D.C.: Nat Academies Press.
- Mitchell, R., W.C. Clark, D. Cash, and N. Dickson, eds. 2006. *Global Environmental Assessments: Information, Institutions, and Influence*. Cambridge: MIT Press.
- van Kerkhoff, L. and L. Lebel. 2006. Linking knowledge and action for sustainable development. *Annual Review of Environment and Resources* 31:1-33.
- van Kerkhoff L. and N. Szlezák. 2006. Linking local knowledge with global action: Examining the Global Fund to Fight AIDS, Tuberculosis and Malaria through a knowledge system lens. *Bulletin of the World Health Org* 84(8): 559-681.
- Clark, W.C., A. Contreras, and K. Harmsen. 2005. *Report of the External Review of the Systemwide Programme on Alternatives to Slash-and-Burn (ASB): Evaluation and Impact Assessment of the ASB Programme*. CGIAR Science Council Secretariat, Washington, DC: FAO.
- Morgan, G., R. Cantor, W.C. Clark, et al. 2005. Learning from the U.S. National Assessment of Climate Change Impacts. *Environmental Science and Technology* 39(23): 9023-9032.
- Kousky, Carolyn. 2005. "Choosing From the Policy Toolbox." Ecosystem Marketplace, [http://ecosystemmarketplace.net/pages/article.opinion.php?component\\_id=4002&component\\_version\\_id=5679&language\\_id=12](http://ecosystemmarketplace.net/pages/article.opinion.php?component_id=4002&component_version_id=5679&language_id=12) (first posted 30 November 2005).
- Clark, W.C., P.J. Crutzen, and H.J. Schellnhuber. 2004. Science for global sustainability: Toward a new paradigm. In *Earth System Analysis for Sustainability*, H.J. Schellnhuber, P.J. Crutzen, W.C. Clark, et al., eds. Cambridge: MIT Press.
- Cash, D., W.C. Clark, F. Alcock, N. Dickson, N. Eckley, D. Guston, J. Jäger, and R. Mitchell. 2003. Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences* 100(14): 8086-8091.
- Clark, W.C. and N. Dickson. 2003. Sustainability science: The emerging research paradigm. *Proceedings of the National Academy of Sciences* 100(14): 8059-8061.
- Parris, T.M. and R. W. Kates. 2003. Characterizing and measuring sustainable development. *Annual Review of Environment and Resources* 28: 559-586.
- Kates, R., W.C. Clark, R. Corell, J.M. Hall, C. Jaeger, I. Lowe, et al. 2001. Sustainability science. *Science* 292: 641-2.
- Social Learning Group. 2001. *Learning to Manage Global Environmental Risks*. W.C. Clark, J. Jaeger, J. van Eijndhoven, N. Dickson, eds. Cambridge: MIT Press.

### Selected web sites:

- Sustainability Science Program at Harvard's Center for International Development, [www.cid.harvard.edu/sustsci](http://www.cid.harvard.edu/sustsci)
- Knowledge Systems for Sustainable Development, [www.ksg.harvard.edu/kssd](http://www.ksg.harvard.edu/kssd)
- Boundary Organizations for Integrating Knowledge and Action in Int'l Development, [www.ksg.harvard.edu/sed/borgs](http://www.ksg.harvard.edu/sed/borgs)
- Sustainability Science and Technology: Linking Knowledge with Action, [www.ksg.harvard.edu/sed/sustsci](http://www.ksg.harvard.edu/sed/sustsci)
- Institutional Design of Payments for Ecosystem Services, [www.ksg.harvard.edu/sed/pes.htm](http://www.ksg.harvard.edu/sed/pes.htm)
- Institutional Innovations for Linking Knowledge with Action in Global Health, [www.cid.harvard.edu/sed/health](http://www.cid.harvard.edu/sed/health)
- Initiative on Science and Technology for Sustainability, [sustainabilityscience.org/ists](http://sustainabilityscience.org/ists)
- National Academies' Roundtable on S&T for Sustainability, [www7.nationalacademies.org/sustainabilityroundtable](http://www7.nationalacademies.org/sustainabilityroundtable)
- Proceedings of the National Academy of Science, [www.pnas.org/misc/sustainability.shtml](http://www.pnas.org/misc/sustainability.shtml)
- Environment: Science and Policy for Sustainable Development Magazine, [www.heldref.org/env.php](http://www.heldref.org/env.php)
- Biological Sciences for the 21st Century: Sustainable Development, [www7.nationalacademies.org/IUBS](http://www7.nationalacademies.org/IUBS)

**For more information** contact Nancy Dickson at [nancy\\_dickson@harvard.edu](mailto:nancy_dickson@harvard.edu).