

Final Progress Report

Sustainability Science Program

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A. RESEARCH ACTIVITIES

It has been a most productive research year for me. During my fellowship, I have worked on a total of ten different publications, of which six have already been accepted for publication (see below). One of these is a book on local governments and rural development, which will be published by the University of Arizona Press later this year. More important than publications, however, has been the opportunity to explore five brand new research topics with my faculty advisors—research topics that are not only new but also probably more closely associated with a sustainability science research agenda than my pre-fellowship research. It is thanks to the fellowship and the support of my faculty advisors that I have been able to pursue these topics.

In this short report, I describe the main ideas related to these new research topics, which are at different stages of development: (1) Motivation problems in social learning activities; (2) A network approach to the study of polycentric governance (3) Local capacity development for environmental governance; (4) Biophysical indicators in policy studies; and (5) Social aspects of geospatial sciences.

(1) Motivation problems in social learning activities

Problem: To create more effective and meaningful spaces where science and policy actors can work together to address complex environmental problems, we need better explanations of why existing efforts to create such spaces sometimes succeed and sometimes fail. I argue that framing this issue as a collective action problem may provide useful insights about the underlying institutional conditions that may make the creation of productive learning environments more or less likely.

Question: Why would policy, science and community actors care to join and engage with each other in the context of organized social learning activities?

Methods: I apply the Institutional Analysis and Development framework to examine the conditions under which social learning about sustainability may flourish. Focusing on individual motivation problems, I carry out an

empirical institutional analysis of opportunities for social learning in a specific policy context: decision-making activities within the Swedish International Development Cooperation Agency.

Literature: Social Learning, New institutional economics

Data: Interviews with Sida employees in Sweden

Region focus: Global

Recomm.: To pay attention to potential motivation problems when designing social learning forums

Product: Paper presented at 2008 AAAS Meetings in the Symposium entitled “How can Social Learning move us towards Sustainability?” The paper has been published as a CID working paper (www.cid.harvard.edu/cidwp/graduate.html), and was recently submitted to the journal *Development and Change*. **Citation:** Andersson, K. 2008. Motivation to Engage in Social Learning about Sustainability. CID Working paper Series.

(2) A Network Approach to the Study of Polycentric Governance (with A. Henry)

Problem: It is increasingly clear that self-governance institutions have the potential to overcome collective action problems famously described in Garret Hardin’s (1968) Tragedy of the Commons. Stories from the field, however, reveal a mixed collection of successes and failures. How do we explain this variation? One promising theoretical approach, labeled “polycentric” governance, is useful for explaining this variation. This perspective suggests that analysts adjust the scope of inquiry beyond individual local organizations to the broad governance system – focusing in particular on the structure of relationships amongst disparate actors. While these ideas have gained considerable attention in the theoretical literature, empirical studies have struggled with the operationalization of variables that characterize the polycentric attributes of a governance system. The purpose of this paper is to explore how the tools of social network analysis might contribute to a methodological advance for empirical studies of polycentricity.

Question: Do connectivity patterns for local actors differ in polycentric vs. monocentric systems? Do these differences lead to variation in outcomes with regards to the conditions for environmental problem solving, opportunities for social learning, and ultimately quality of governance?

Methods: We use the metaphor of policy networks to operationalize the central tenants of polycentricity, and to identify systems as “more” or “less” polycentric. Second, we derive hypotheses of polycentric governance that

are empirically testable using modern methods of network analysis. These hypotheses focus on how the structure of networks within governance systems influences local outcomes. Third, we test a subset of these hypotheses using data on policy networks and governance outcomes within municipal forest management regimes in Bolivia (and possibly Peru and Guatemala). Hypotheses are tested using a variation of a quadratic assignment procedure that is amenable to the analysis of multiple egocentric networks.

Literature: Social Network Analysis, Federalism, Polycentric governance

Data: Interviews with local government actors in Bolivia, Peru and Guatemala.

Region focus: Bolivia (and control data from Peru and Guatemala)

Recomm.: TBD

Product: Poster accepted for presentation at the Networks in Political Science Conference at Harvard University, June 13 – 14, 2008. Based on discussions at the conference, we plan to revise the paper and submit it to either American Journal of Political Science or American Political Science Review in late summer, 2008. **Citation:** Henry, A.R. and Andersson, K. A. Social Networks Approach to Studying Polycentric Governance. Under preparation.

(3) Local capacity development for environmental governance

Problem: Central government definitions of local capacity are often limited to the education level of local government officials, the amount of revenues they raise and resources they spend. This limited conception of local capacity usually produces efforts to strengthen local governance by training local government staff in performing typical administrative tasks, such as planning, budgeting, accounting, monitoring, and evaluation. In this research, I hypothesize that such formal skills are insufficient to produce public services that support human development, and that a broader understanding of local capacity need to form the basis for capacity building programs.

Question: Which aspects of local capacity are most critical for the efficient production of effective municipal services?

Methods: With the assistance of Merilee Grindle and former KSG graduate Gonzalo Delamaza (who is now a faculty member at the Universidad de los Andes in Chile), I am developing a comparative analysis of a “matched pair” of Chilean municipalities, both with similar natural endowments, socioeconomic characteristics, demographics, as well as the level of

formal training and continuity of leadership. What sets them apart, however, are fundamentally different governance approaches (one which we may call “traditional” and one more “progressive” in terms of developing co-governance structures). For the fieldwork and qualitative analysis, I collaborate with Gonzalo Delamaza. Eventually, we will also coauthor the paper. At a later stage of the research, I will attempt to test some of the preliminary findings from the case studies with existing longitudinal survey data from a cross-section of Chilean municipalities.

Literature: Local governance, Decentralization, Latin American studies

Data: Field observations, secondary data on municipal decision making in two matched local municipalities

Region focus: Chile, South America

Recomm.: TBD

Product: Paper presented at ISA 2009, eventually submitted to *Governance, World Development*, or *Public Administration Review*. **Citation:** Andersson, K. and Delamaza, G. The Meaning of Local Capacity and Decentralized Public Services in Chile. Under preparation

(4) Biophysical indicators in policy studies

Problem: Most existing studies on environmental governance in developing countries do not integrate biophysical and social data. This produces incomplete scientific understandings of which policy strategies are most likely to work in addressing environmental problems in particular contexts.

Question: Which biophysical indicators are meaningful, useful, and most readily available for assessing the efficacy of natural resources policies? How may policy analysts incorporate these variables into on-going empirical work?

Methods: With the assistance of Peter Rogers, I have worked on the development of new measures for policy outcomes related to forest governance, utilizing GIS and spatial statistics. I foresee these to have applicability in my comparative policy study of forest policies in Bolivia, Guatemala, and Peru. Colleagues in these countries are currently collecting data, involving personal interviews with 900 local governance actors and time-series observations of forest cover change. The full data set will be completed by the end of 2008.

Literature: Natural Resources Management, Environmental policy, forestry sciences

Data: Survey data, satellite imagery

Region focus: Bolivia, Guatemala, and Peru

Recomm.: I seek to develop recommendations for policy analysts and practitioners on how to develop context-sensitive indicators for monitoring and assessing local governance performance in the forestry sector.

Product: A set of eight papers co-authored with Evans (Indiana) and Gibson (UC-San Diego) as well as colleagues from the three countries will be presented at two associated panels at AAG 2009, and eventually submitted for consideration to appear in a special issue dedicated to the topic of Decentralized Forest Governance and Environmental Change in Latin America. The proposal for a special issue will be sent to journals such as *World Development*, *Forest Management and Policy*, *Ecology and Society*, *PNAS*, *GEC*, or *JPAM*. **Citation:** Andersson, K. Gibson, C. and Evans, T. (Eds) Decentralized Forest Governance and Environmental Change in Latin America. Under preparation.

(5) Social Aspects of Geospatial Sciences

Problem: The revolution in geospatial sciences has left social institutions out of synch. They have not kept up with the fast pace of change. This has enabled the technology to develop quite unrestricted, which has both positive and negative consequences. On the positive side, it means that innovation has reigned freely with little interference. But it also means that there may be a potential under-provision of public goods associated with these technologies. There are both positive and negative externalities that have not been addressed by social institutions and this is likely to produce negative effects for technology development and society. To capitalize on the spatial science revolution for the benefit of human development, it is urgent to address the governance of spatial science and technology.

Question: How does geospatial technology and science shape human development? How may social institutions be constructed to enhance the human development contributions of geospatial technology?

Methods: Together with Calestous Juma, Esther Mwangi, and Godstime James, I will collect and analyze cases that describe ways in which geospatial technology shape society and vice-versa. We are currently exploring different forums for collecting these, and will write a funding proposal to organize a symposium/workshop to which we would invite case study authors (Winter/Spring 2009).

Literature: Science and Technology, governance

Data: Case studies of GIS applications for human development, identifying opportunities and pitfalls

Region focus: Global

Recomm.: TBD

Product: Concept paper ready by the end of 2009. Workshop and proceedings Winter/Spring 2009, and submission of edited volume in 2009/2010.
Citation: James, G., Mwangi, E. and Andersson, K. Social Aspects of Geospatial Sciences. Under preparation.

B. Description of other intellectual activities

One of the most rewarding activities during the year has been my collaboration with other sustainability science fellows to develop a Ruffolo Curriculum on Sustainability Science. The goal for this semester's collaboration was to produce a ready-to-teach syllabus that any instructor could adapt for a graduate seminar on sustainability science. At the time this report "went to press", about 85 percent of the 12 modules in this curriculum were completed. The curriculum will be an important output for my future teaching career at the University of Colorado, where I intend to offer this seminar to graduate students in the Environmental Studies Program in the fall of 2009. The group also submitted a proposal to present results of this activity at the 2009 AAAS meetings. The table below presents a summary of all the modules included in this year's version of the e curriculum. Participants in the group has agreed to form a Ruffolo Curriculum editorial board to continue this work after the fellowship ends, so that an annually revised update of the curriculum may be published by the program.

The 2008 Ruffolo Curriculum on Sustainability Science

Module	Themes	Contributors
1	Sustainability Science Overview	Adam Henry, Fred Carden
2	Principles and Values	Marcel Burzstyn, Krister Andersson, Adam Henry
3	Trends: Linking Humans and the Environment	Ann Laudati, Godstime James
4	Resilience and Vulnerability	Mike Burns
5	Tools: Complex Systems Analysis	Kira Matus, Adam Henry
6	Governance 1: What is governance and why is it important?	Krister Andersson, Suerie Moon
7	Governance 2: The Analysis of Governance	Adam Henry, Krister Andersson
8	Governance 3: Cross-scale governance	Lorenzo Casaburi, Adam Henry, Krister Andersson
9	Transdisciplinarity	Mike Burns
10	Knowledge Integration; Knowledge to Action	Kira Matus; Bets McNie
11	Social Learning and Evaluation	Fred Carden, Kira Matus
12	Reflections and Course Wrap-Up	All

During the fellowship, I have worked on a total of ten different publications, all of which are at different stages in the review and publication process. Six of the texts have been accepted for publication, two have been re-submitted for a second round of reviews, and two more papers were recently submitted. Most important of these was the book manuscript *Decentralization and Rural Development* accepted for publication in 2008 with the University of Arizona Press:

Andersson, K. Gordillo, G. and van Laerhoven, F. 2008. *Decentralization and Rural Development: Local Governance Lessons from Latin America*. Tucson, AZ: Arizona University Press.

The following five journal articles/book chapters are now published or forthcoming:

Andersson, K. and Ostrom, E. 2008. Analyzing Decentralized Natural Resource Governance from a Polycentric Perspective. *Policy Sciences* 41(1):1-23.

Tucker, C. M., Randolph, J.C., Evans, T.P., Andersson, K.P., and Persha, L. 2008. An Approach to Assess Relative Degradation in Dissimilar Forests. *Ecology and Society* 13(1): 4.

Bartley, T. Andersson, K. Jagger, P. and van Laerhoven, F. 2008. The Contribution of Institutional Theories to Explaining Decentralization of Natural Resource Governance. *Society and Natural Resources* 21(2):160-174.

Andersson, K. and van Laerhoven, F. 2007. From Local Strongman to Facilitator: Institutional Incentives for Participatory Municipal Governance in Latin America. *Comparative Political Studies* 40(9):1085-1111

Gordillo de Anda, G. and Andersson, K. Forthcoming. Grafting the Head of Liberty? Latin America's Move to the Left. In Aurelian Craiutu & Sheldon Gellar (Eds) *Conversations with Tocqueville: The Global Democratic Revolution in the 21st Century*. Lanham, MD: Lexington Books, xx-yy (projected for January 2009).

My co-authors and I have also re-submitted two papers:

Andersson, K. Evans, T. and Richards, K. In review. National Forest Carbon Inventories: Policy Needs and Assessment Capacity. Re-submitted to *Climatic Change*.

Kauneckis, D. and Andersson, K. In review. Making Decentralization Work: A Cross-National Examination of Local Governments. Submitted to *Studies in Comparative International Development*

Finally, I have submitted two new papers:

Andersson, K. and Agrawal, A. In review. Inequality, Local Institutions, and Environmental Change. Submitted to *Global Environmental Change*

Andersson, K. In Review. Motivation to Engage in Social Learning about Sustainability: An Institutional Analysis. Submitted to *Development and Change*.

Since September, I have carried out peer reviews for the following publishers, journals, and professional associations:

- Centre for Development and Environment (Switzerland)
- Climate Policy
- Conservation and Society
- Environmental Management
- International Association for the Study of the Commons
- International Forestry Review
- John Wiley & Sons Inc.
- Journal of Policy Analysis and Management
- National Science Foundation
- Oxford University Press
- Swedish Research Council, and
- University of Arizona Press

C. Principal collaborators outside Harvard

Abwoli Banana, Makerere U. Uganda

Arun Agrawal, U of Michigan

Carlos Icaza, OECD

Clark Gibson, UC San Diego

Dan Altrell, FAO

David Brown, U of Colorado

Derek Kauneckis, U of Nevada at Reno.

Edwin Castellanos, U del Valle, Guatemala

Elinor Ostrom, Indiana U.

Frank van Laerhoven, Indiana U.

Frank van Laerhoven, U of Utrecht

Glenn Wright, U of Colorado

Gonzalo Delamaza, U de los Andes, Chile

Gustavo Gordillo, Indiana U

Kenneth Richards, Indiana U.

Miguel Jaramillo, GRADE, Peru

Paul Ongugo, KEFRI, Kenya

Rosario Leon, CERES, Bolivia

Tom Evans, Indiana U.

Post fellowship contact information

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