

## **Final Progress Report**

Sustainability Science Program

September 1, 2007 – July 31, 2008

Name: Jessica Leino

Date: 27 May 2008

Your field(s): Economics

Your degree program, institution and graduation date: Ph.D. in Economics, University of California Berkeley, 22 May 2008

Faculty host(s) at Harvard name and department: Professor Michael Kremer, Economics Department

Description of SSP-related research activity, including a title:

“Ladies First? Gender and the Community Management of Water Infrastructure in Kenya”

In this project, I analyze data collected on over 300 water user committees over a three year period. A randomly selected half of committees in the study received a “gender encouragement” intervention aimed at boosting female participation in managing local water sources. I examine whether this intervention increased women’s participation and whether and how increases in female participation affect a wide variety of measures of committee performance.

### **Abstract (one paragraph):**

There is a wide consensus that women’s participation is important for managing local public goods, but there is little evidence that gender advocacy efforts can be effective in boosting participation and improving project outcomes. This paper estimates the extent to which women’s participation is enhanced by advocacy efforts and how women’s increased participation affects water infrastructure maintenance in rural Kenya. Half the communities that received improved water source infrastructure through an NGO program were randomly selected to receive an intervention encouraging the communities to increase female participation on the committees responsible for maintaining that infrastructure. This intervention more than doubled the probability that the chairperson was female and increased the number of women on committees by an average of 21 percent. However, this increased female participation did not significantly impact water source maintenance outcomes. These results suggest that gender advocacy can be a useful means of boosting women’s participation, with little distortion in the effectiveness of these committees in delivering public goods, but there is no evidence that this enhanced participation by women results in greater project sustainability.

### **Identification of the problem you address (1 sentence to a paragraph):**

Effective management of public goods is of paramount concern in settings of resource scarcity where access to these goods may be a significant component of human well-

being. Women have traditionally played a significant role in conserving and managing natural resources at the local level (see, e.g., Bina Agarwal's work on forest resources). However, in many areas of the world women's participation in the formal institutions that have arisen to manage such resources at the local level is constrained by a variety of social and economic factors.

**Key question asked about the problem (1 sentence to a paragraph):**

Can simple and inexpensive interventions to encourage women's participation in the local management of environmental goods boost women's involvement? Does increased female participation due to such interventions translate into better resource management outcomes?

**The methods by which you answered that question (1 sentence to a paragraph):**

I use exogenous variation created by random assignment of interventions designed to increase women's participation on water user committees to identify the effects of the intervention on user committee composition and maintenance outcomes. Because the committees selected to receive the intervention were chosen randomly and communities that received different interventions are similar along observable dimensions prior to the intervention, they are also likely to be similar along unobservable dimensions, so any differences in outcomes among the groups can be attributed to the interventions. I can thus identify a causal impact of women's participation on outcomes, unlike much of the existing empirical evidence on the effect of women's participation in public good management, which is hampered by concerns about reverse causality and omitted variables bias. In much of the literature, it is difficult to determine whether the inclusion of women causes a particular outcome to occur or if the fact that an outcome occurs encourages the participation and inclusion of women. It is also difficult to rule out the possibility that some other factor is driving both women's participation and the outcome.

**Principle literature upon which the research drew (methodological and substantive, e.g., innovation, incentive-based environmental management, science and technology studies):**

This research draws on the theoretical and empirical literature on the effect of women's participation in local governance and public good management, which comes from various disciplines in the social sciences (including anthropology, political science, and economics). I also drew on experimental studies in psychology and economics that examine whether women supply differing levels of public goods or are more cooperative than men and the labor economics literature that examines the effects of affirmative action policies.

**Empirical data acquisition description (1 sentence to a paragraph):**

Over the past three years, I have collected data on all members of gender encouragement and comparison committees, including demographics (e.g. age, education, ethnicity), individual "social capital" measures (e.g. voluntary associational activities), and knowledge of current maintenance conditions. I also have information from committee records on finances, attendance at committee meetings, the number of

meetings held, and committee activities. In addition, field staff made random unannounced visits to all water sources several times each year. During these visits information on maintenance quality was gathered using a standard survey instrument, and water samples were collected. The water samples were taken to a local laboratory for analysis, where total coliform counts and *e. coli* counts were measured (*E. coli* are an indicator bacteria for the presence of diarrhea-causing fecal coliforms). For approximately half of my sample, I have demographic data and social capital measures for a randomly selected group of women in each community of water users, who provide a comparison for women from the community who are elected to the user committee. At approximately 195 of the user committees that were initially supported by another organization, I also have information on committee membership prior to the gender encouragement intervention, which enables me to map out how committee membership changed in response to the intervention.

**Geographical region studied (if appropriate):** Western Kenya

**Recommendations that might be relevant for your problem (1 sentence to a paragraph):**

I find that encouraging women to take management roles on user committees works to increase women's participation. To the extent that this is a desirable outcome in and of itself, the intervention was successful. However, boosting female participation does not automatically lead to greater group effectiveness, even with active participation by women and with women taking on leadership responsibilities.

**A description of the final product(s) you have/are aiming to produce (e.g., article in X journal):**

I would like to produce an article based on this work for a top generalist journal in economics or the top field journal in development economics. I am also submitting this work to the CID working paper series.

**Description of major other intellectual or professional advancement activity(ies) over the past academic year, including working title(s) (e.g., PhD qualifying paper, dissertation, non-SSP research project paper, job search):**

I completed my doctoral dissertation, entitled "Community and Private Sector Approaches to Development in Kenya," this May. My dissertation abstract follows:

Economic development policy increasingly emphasizes the role of communities and the private sector. Communities may enjoy informational advantages in providing services, while the private sector can provide considerable employment and growth opportunities. This dissertation presents three essays that investigate the impact of community and private sector approaches to development in rural Kenya. The first two chapters explore the design of community-based institutions that provide and maintain rural water infrastructure. The third chapter examines the productivity of teams in commercial agriculture.

Chapter 1 studies the extent to which women's participation in local public goods management is enhanced by advocacy efforts and how increased women's participation

affects water infrastructure maintenance. Gender advocacy can be a useful means of boosting women's participation, with little distortion in the effectiveness of these committees in delivering public goods. However, there is no evidence that enhanced participation by women results in greater project sustainability.

Chapter 2 examines the health impacts and valuation of improved water sources, and the potential effects of alternative property rights institutions. Improvements in water infrastructure lead to large improvements in source water quality, increased use of improved water sources, moderate gains in home water quality and to a one quarter fall in reported child diarrhea incidence. Households appear willing to spend an additional 100 hours per year to walk to improved water sources. Simulations suggest that a social planner would only improve water sources with many nearby households. Allowing landowners to charge households for protected water only if they continue to provide access to unprotected water is Pareto improving relative to the status quo.

Chapter 3 studies the productivity of teams of casual workers in Kenya's commercial agriculture sector. Workers choose to sort into more ethnically homogenous teams than would be expected with random matching, but ethnically diverse teams are more productive even after controlling for individual fixed effects. Workers may prefer to trade off higher earnings for opportunities to socialize or for mutual insurance, both of which may be easier to provide within tribal groups. Productivity may thus be improved by facilitating inter-ethnic team formation or by offering formal insurance schemes.

I also undertook a job search, interviewing primarily for development policy positions. Over the course of the last year, I interviewed with Google.org, the Hewlett Foundation, the Center for Global Development, IQSS, IFPRI, the International Finance Corporation (IFC) and the Young Professionals Program at the World Bank, among others. I have accepted a position with the Young Professionals Program, which I will start in September.

**Please list citations for reports, papers, publications and presentations that built on your fellowship research (please list full citations here, paragraph length abstracts, and attach copies of URLs if possible):**

*Working Papers:*

“Ladies First? Gender and the Community Management of Water Infrastructure in Kenya.” May 2008.

**Abstract:** There is a wide consensus that women's participation is important for managing local public goods, but there is little evidence that gender advocacy efforts can be effective in boosting participation and improving project outcomes. This paper estimates the extent to which women's participation is enhanced by advocacy efforts and how women's increased participation affects water infrastructure maintenance in rural Kenya. Half the communities that received improved water source infrastructure through an NGO program were randomly selected to receive an intervention encouraging the communities to increase female participation on the committees responsible for maintaining that infrastructure. This intervention more than doubled the probability that the chairperson was female and increased the number of women on committees by an

average of 21 percent. However, this increased female participation did not significantly impact water source maintenance outcomes. These results suggest that gender advocacy can be a useful means of boosting women's participation, with little distortion in the effectiveness of these committees in delivering public goods, but there is no evidence that this enhanced participation by women results in greater project sustainability.

“Spring Cleaning: Rural Water Impacts, Valuation, and Institutions.” February 2008. (with Michael Kremer, Edward Miguel, Alix Peterson Zwane). Online at: <http://www.economics.harvard.edu/faculty/kremer/papers/springclean.pdf>.

**Abstract:** We study a randomly phased-in spring protection program to understand the health impacts and valuation of clean water, and the potential effects of alternative property rights institutions in rural Kenya. Spring protection leads to large improvements in source water quality as measured by the fecal indicator bacteria *E. coli*. This translates to moderate gains in home water quality and to a one quarter fall in reported child diarrhea incidence. Households increase their use of protected springs. Revealed preference estimates of household willingness to pay (WTP) for improved water quality derived from a travel cost analysis are only one-third of stated preference valuations for spring protection. An upper bound on willingness to pay per case of diarrhea averted is only US\$0.86-1.72, considerably below figures used in health cost effectiveness analyses. Simulations based on estimated preferences for cleaner water suggest a social planner would only protect springs with many nearby households. Springs in Kenya are common property resources, limiting private incentives to protect springs to improve water quality, yet strong private property rights would yield lower social welfare than the status quo. However, allowing landowners to charge households for protected spring water only if they continue to provide access to unprotected water is Pareto improving relative to the status quo.

“The Social Dimensions of Productivity in Teams: Evidence from Kenya's Commercial Agriculture Sector.” May 2008.

**Abstract:** This paper studies how team characteristics impact productivity using unique data from casual workers in Kenya's commercial agriculture sector who are paid a joint piece rate based on the output of their work team. It finds that workers choose to sort into more ethnically homogenous teams than would be expected with random matching, but that ethnically diverse teams are more productive even after controlling for individual fixed effects. This paper presents suggestive evidence that workers may prefer to trade off higher earnings for opportunities to socialize or for mutual insurance, both of which may be easier to provide within tribal groups. Workers do not appear to choose teammates based on their prior productivity, and there is also less long-term team formation than might be expected given worker's freedom to choose their own work teams. Thus, there may be opportunities to boost productivity by encouraging inter-ethnic team formation or by offering formal insurance schemes.

*Presentations:*

“Community Management of Water Infrastructure: Evidence from a Randomized Evaluation in Kenya.” October 2007. Development Lunch, Economics Department, University of California Berkeley.

“Community Management of Water Infrastructure: Evidence from a Randomized Evaluation in Kenya.” October 2007. Development Seminar, Economics Department, University of California Berkeley.

“Community Management of Water Infrastructure: Evidence from a Randomized Evaluation in Kenya.” November 2007. Sustainability Science Seminar, Center for International Development, Harvard University.

“Community Management of Water Infrastructure: Evidence from a Randomized Evaluation in Kenya.” November 2007. Northeastern Universities Development Conference, Harvard University.

“Ladies First? Gender and the Community Management of Water Infrastructure in Kenya.” February 2008. International Food Policy Research Institute (IFPRI), Washington, DC.

“Ladies First? Gender and the Community Management of Water Infrastructure in Kenya.” February 2008. International Finance Corporation (IFC), Washington, DC.

“The Social Dimensions of Productivity in Teams: Evidence from Kenya’s Commercial Agriculture Sector.” April 2008. Sustainability Science Seminar, Center for International Development, Harvard University.

**Principal collaborators outside Harvard (list name and institution):**

Edward Miguel, University of California Berkeley  
Alix Zwane, Google.org

**List any awards or grants that you have received this year for the current or coming year. Please provide details regarding title of award, financial amount, and date of award:**

N/A

**If you are moving to a new position, please list your contact information there:**

From 8 September 2008:  
Young Professionals Program  
The World Bank  
1818 H Street NW  
Washington, DC 20433  
USA

My office phone/fax/email have not yet been assigned, but I can always be reached via email at leino@post.harvard.edu.

**Please attach an updated CV. Attached!**