

Final Progress Report

Sustainability Science Program

September 1, 2008 – August 31, 2009

Name: Rema Hanna

Date: August 5, 2009

Field(s): Development Economics/Environmental Economics

Your degree program, institution and (expected) graduation date:

Harvard Kennedy School, Faculty Member

Faculty host(s) at Harvard name and department: Rohini Pande (HKS), Sendhil Mullainathan (Economics)

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

Air Pollution in India

The Impacts of Indoor Air Pollution: Evidence from an Experiment in India

Abstract (one paragraph):

The Impact of Air Pollution on Health in India: This research on the impact of air pollution on health in India will advance understanding of the potential impact of environmental policies in low income countries. The first project examines the effect of indoor air pollution (IAP) on health and well-being in India. Indoor air pollution results from cooking with solid fuels on open fires and/or in traditional stoves. It is thought to be one of the greatest dangers to individuals in developing countries. This study randomly assigns “clean” stoves that reduce indoor air pollution concentrations dramatically. The idea is to measure the impact of the assignment of the clean stoves on a series of infant, child, and adult health outcomes, as well as a series of economic outcomes (e.g., labor supply and school attendance). The preliminary results indicate that there is a reduction in smoke exposure (measured by the carbon monoxide content of respondents’ breath), thus the study will be able to measure the causal impact of IAP on health and other outcomes. The study involves 2,500 households in Orissa, India, which is one of the poorest states in India. It is only the second randomized evaluation of clean stoves and its sample size (five times larger than the other study) means that it will be able to provide much more definitive answers to key questions. A second project studies the impact of distributing improved cooking stoves, which are designed to reduce indoor air pollution, on respiratory health and economic well-being. It is the largest randomized evaluation to date of an improved stove program, with 2500 households participating in the project, in one of the poorest and most remote areas in India. The study will examine whether the stoves reduce exposure to air toxins. The study will examine mid-line survey data to ascertain whether the reduction in toxin exposure translates to health gains. The second project examines the relationship between air pollution and infant mortality across Indian Cities. It analyzes a data set on air pollution rates and infant mortality rates in about 90 Indian cities over 15 years involving data collected from about 15 Indian states.

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

This project aims to understand the impact of air pollution on health, and also to understand what types of policies reduce air pollution.

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

I employ a variety of quasi-experimental and experimental techniques.

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

The research draws upon the previous literature on recent statistical innovations in development economics.

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

The data for the ambient air pollution project has been gathered; we are currently analyzing the data.

Geographical region studied (if appropriate): India

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

There is a draft of a paper called "Regulating Pollution" on the impact of regulation on air and water policies. I am currently analyzing the data from the stoves project, and hope it will develop into an academic paper. I am also in the process of writing a book that puts the results from the regulating pollution paper into a accessible form for policy makers.

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 currently have three papers with revise and resubmits to journals (including the AER), I have two papers under submission, and have co-written a draft of a Handbook Chapter.

An Event Study Analysis of the Relationship Between Inspections and Firm Level Emissions, with Paulina Oliva, Berkeley. Revise and Resubmit at BE Press.

U.S. Environmental Regulation and FDI: Evidence from a Panel of U.S. Based Multinational Firms, Development Research Institute Working Paper #23. Revise and Resubmit at AEJ: Micro Incentives Works: Getting Teachers to Come to School,

Joint with Esther Duflo, MIT, and Stephen Ryan, MIT, Revised version of: Bread Working Paper #103; Development Research Institute Working Paper # 16; NBER Working Paper #11880. [Program evaluated in this paper won the Digital Learning Award of India of 2007]. Revise and Resubmit at the American Economic Review

Principal collaborators outside Harvard (list name and institution):

Michael Greenestone, MIT

Ben Olken, MIT

Esther Duflo, MIT

Leigh Linden, Columbia

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:

Spencer Grant, \$40,000

Mind Brain and Behavior Grant (Internal Harvard Grant): \$20,000

Empowerment Grant (Internal Harvard Grant): \$24,000

South Asia Initiative Grant (Internal Harvard Grant): \$5,000