

3ie-IFPRI Joint Seminar: *Measuring the Unmeasurable: Applying a Broader View of Mixed Methods to Evaluate the Impact of Energy-Efficient Home Heating Stoves in Mongolia*

June 25, 2015

[Leslie Greene](#), Program Manager at Social Impact, presented the evaluation findings from their Mongolian Energy and Environment Project (EEP) at the [3ie-IFPRI joint seminar series](#) in Washington D.C. on June 25th (full paper [here](#)). The authors use data from a three-phase panel dataset, electronic stove use monitors to measure household stove emissions and indoor air quality, along with ambient air quality modeling to test whether the promotion of energy efficient technology reduces ambient air pollution and leads to better health outcomes.

The authors faced a number of challenges in evaluating this project. First, the authors did not have a true counterfactual as participants self-selected into the program and it was offered universally to residents of Ulaanbaatar's "ger district." Second, ambient air quality is difficult to measure given the low quality of pollution measurement infrastructure in Mongolia and attributional uncertainty of pollutants. Finally, the evaluation budget did not allow for direct measurement of important indicators such as household-level fuel consumption and health outcomes. In an attempt to overcome selection bias the evaluators use propensity score matching to construct a counterfactual based on observable variables. Leslie noted a key limitation of this approach is their inability to measure unobservable factors affecting project take-up. The evaluation measures ambient air quality by geospatially modeling of the distribution of cookstove pollution. In the absence of direct measurements, the authors use a detailed household-level survey to explore the consumption, expenditure and health-related outcomes.

Project implementers posited that adopting clean cookstoves would reduce coal use and emissions leading to improved air quality. As a result, implementers expected that the population would experience better health quality and lower health expenditures. The authors find statistically significant evidence that households using Millennium Challenge Account (MCA) energy-efficient stoves produced 65% less particulate matter sized below 2.5 micrometers (PM_{2.5}) and 16% less carbon monoxide emissions, though there were no statistically significant differences in fuel consumption. Overall, the authors conclude that use of MCA stoves results in a 30%, statistically significant reduction in PM_{2.5} concentrations attributable to cookstoves.

Leslie noted that limited compliance with MCA usage guidelines may contribute to the insignificant reductions in fuel consumption. Unfortunately, the evaluators did not collect qualitative data to examine this hypothesis. Leslie concluded that a correlation may exist between poorer households and non-compliance, and suggested that future interventions might be coupled with the installation of household insulation to discourage warm stove refueling.

[Donee Alexander](#), Program Manager, Environment and Health, for the Global Alliance for Clean Cookstoves, was the discussant for this seminar. Donee was impressed by the scale of the evaluation and noted its contribution to broadening the evidence base of how pollution from cookstoves affects ambient air quality and the community at large. Many of the questions posed by Donee and the participants concerned the null results in fuel use reduction. Donee suggested implementers give more detailed instruction to recipients as to why proper use is essential to achieve the expected benefits as a possible solution to non-compliance with cold start stove use instructions.