washplus Weekly
Supportive Environments for Healthy Communities

Issue 115 September 6, 2013 | Focus on Monitoring & Evaluation of Cookstoves

This issue contains 2013 studies and resources on the monitoring and evaluation of cookstoves. Studies discuss the need for improved exposure assessment, the importance of multiple replicate tests, how to quantify stove adoption with stove use monitors, and other issues. Country studies evaluate use of the Jiko Poa cookstove in Kenya and solar ovens in Nigeria. A rapid assessment in Ghana offers a rigorous modest-cost method for evaluating user uptake, field-based stove performance, and exposure to smoke. Other country studies discuss carbon monoxide measurements as a surrogate for particulate matter measurements in Guatemala and factors that influence cookstove adoption in Indonesia.

GENERAL/OVERVIEW

- **Assessing the Climate Impacts of Cookstove Projects: Issues in Emissions Accounting**, 2013. C Lee. (Link, pdf)
  This paper evaluates the quantification approaches of three key variables in calculating emission impacts: biomass fuel consumption, fraction of nonrenewable biomass, and emission factors for fuel consumption. Key research needs identified include incorporating accounting for uncertainty; developing additional default factors for biomass consumption for baseline stoves; refining monitoring approaches for cookstove use; broadening the scope of emission factors used for cookstoves; and accounting for non-carbon dioxide gases and black carbon, among others.

- **Health and Household Air Pollution from Solid Fuel Use: The Need for Improved Exposure Assessment**. *Env Health Perspec, July 2013*. Y Wang. (Link, pdf)
  The following priority research areas were identified to explain variability and reduce uncertainty of household air pollution exposure measurements: improved characterization of spatial and temporal variability for studies examining both short- and long-term health effects; development and validation of measurement technology and approaches to conduct complex exposure assessments in resource-limited settings with a large range of pollutant concentrations; and development and validation of biomarkers for estimating dose. Addressing these priority research areas, which will inherently require an increased allocation of resources for cookstove research, will lead to better characterization of exposure response relationships.

- **How Many Replicate Tests Do I Need? Variability of Cookstove Performance and Emissions Has Implications for Obtaining Useful Results**, 2013. Y Wang.

(Link, pdf)
The authors demonstrate that interpretation of the results comparing stoves could be misleading if only a small number of replicates have been conducted. They then describe a practical approach, useful to both stove testers and designers, to assess the number of replicates needed to obtain useful data. The takeaway: Caution should be exercised in attaching high credibility to results based on only a few replicates of cookstove performance and emissions.

- **Improving Stove Evaluation Using Survey Data: Who Received Which Intervention Matters**. *Ecological Economics, 93 2013*. V Mueller. (Link, pdf)
  In evaluating improved stoves' relative benefits, little attention has been given to who received which stove intervention due to choices that are made by agencies and households. Using Chinese household data, the authors find that the owners of more efficient stoves (i.e., clean-fuel and improved-biomass stoves, as compared with traditional-biomass and coal stoves) live in less healthy counties and differ, across and within counties, in terms of household characteristics such as assets. As a result, efficient stoves appear to provide fewer health benefits than they actually do. Unlike tests that lack controls, preferred tests with controls suggest clean fuels yield more health benefits than do traditional-biomass stoves.

- **Quantitative Metrics of Stove Adoption Using Stove Use Monitors (SUMs).** *Biomass & Bioenergy, July 2013*. I Ruiz-Mercado. (Link pdf)
  Cookstoves that are introduced to reduce fuel use or air pollution need to be objectively monitored to verify the sustainability of these benefits. Quantifying stove adoption requires affordable tools, scalable methods, and validated metrics of usage. The authors quantified the longitudinal patterns of chimney-stove use of 80 households in rural Guatemala, monitored with SUMs over a period of 32 months.

- **Tackling the Health Burden from Household Air Pollution (HAP): Development and Implementation of New WHO Guidelines**. *Air Quality and Climate Change, 47(1) 2013*. N Bruce. (Link, pdf)
  As discussed in this paper, the guidelines currently in development will include reviews of a wide range of evidence, including fuel use in homes, emissions from stoves and lighting, household air pollution and exposure levels experienced by populations, health risks, impacts of interventions on HAP and exposure, and also key factors influencing sustainable and equitable adoption of improved stoves and cleaner fuels.

- **Test Kitchen Studies of Indoor Air Pollution from Biomass Cookstoves**, 2013. K Grabow. (Link, pdf)
  This study investigated the effect of increasing air exchange rates in a test kitchen. Opening the door and window in a test kitchen lowered the particulate matter (PM) 1-hour concentrations between 93 to 98 percent compared to the closed kitchen, and the carbon monoxide (CO) 1-hour concentrations were 83 to 95 percent lower.

- **A Tool for Conducting Population, Health and Environment Behavior Monitoring Surveys,** 2013. E Torrell. (Link, pdf)
  The Population, Health and Environment (PHE) Behavior Monitoring Survey tool is designed to help PHE practitioners develop and implement situational and behavior monitoring surveys. It recognizes that PHE intervention designs must be tailored to the specific needs of the place where they are implemented.

COUNTRY STUDIES

- **Burkina Faso – Impact Evaluation of Improved Stove Use in Burkina Faso, FAFASO**, 2013. G Benscha. (Link, pdf)
  The intervention, called *Foyer Amélioré au Burkina Faso* (FAFASO), differs from other earlier improved cookstove promotion programs in Burkina Faso in not providing direct subsidies. Instead, it focuses on the training of stove producers (whitesmiths and potters), sensitization, and marketing campaigns.

- **Ghana – A Rapid Assessment Randomised-Controlled Trial of Improved Cookstoves in Rural Ghana**, 2012. J Burwen, International Initiative for Impact Evaluation. (Link, pdf)
  Researchers conducted a rapid assessment, randomized-controlled trial to quantify changes in fuel use, exposure to smoke, and self-reported health attributable to deployment of an improved wood cookstove in the Upper West region of Ghana. This method offers a rigorous modest-cost evaluation of user uptake, field-based stove performance, and exposure to smoke.

- **Guatemala – Longitudinal Relationship between Personal CO and Personal $PM_{2.5}$ among Women Cooking with Woodfired Cookstoves in Guatemala**. *PLoS ONE, Feb 2013*. J McCracken. (Link)
  This work provides evidence that in settings where there is a dominant source of biomass combustion, repeated measures of personal CO can be used as a reliable surrogate for an individual's $PM_{2.5}$ exposure. This finding has important implications for the feasibility of reliably estimating long-term (months to years) $PM_{2.5}$ exposure in large-scale epidemiological and intervention studies of HAP.

- **A Field Assessment of Adoption of Improved Cookstove Practices in Yogyakarta, Indonesia: Focus on Structural Drivers**, 2012. C Geary. (Link, pdf)
  The assessment results are relevant to designing an intervention to increase improved cookstove adoption and decrease IAP. Some of these include: In remote rural areas, wood is plentiful and it is unlikely people are going to stop using wood as fuel any time soon. Improved woodstoves need to continue to be an option. Young adults are more likely to adopt cleaner fuels than older adults. Men have more input into cookstove decisions and acquisition when they are being used for home industry. Public demonstration of the effectiveness of improved stoves is important as is follow-up with consumers after their purchases.

- **Kenya – Monitoring and Evaluation of the Jiko Poa Cookstove in Kenya**, 2013. Berkeley Air Monitoring Group. (Link, pdf)
  The Jiko Poa is a locally manufactured rocket-type biomass cookstove being distributed in Kenya by the Paradigm Project. The aim of this study was to provide a performance assessment for the Jiko Poa in Kenyan homes by analyzing its effects on HAP and fuel use and by collecting qualitative and quantitative data on how the households valued and used it.

- **Lao PDR – Pathways to Cleaner Household Cooking in Lao PDR: An Intervention Strategy**, 2013. World Bank. (Link, pdf)
  This study is the key activity under the first phase of the Clean Stoves Initiative for Lao PDR. Its broad aim is twofold: taking stock of the current status of IAP and household

cookstove use in Lao PDR and proposing an effective intervention strategy to promote improved cookstoves.

- **Nigeria – Performance Evaluation of a Double-Glazed Box-Type Solar Oven with Reflector.** *Journal of Renewable Energy, Apr 2013*. J Folaranmi. (Link)
  This research paper describes the performance evaluation of a double-glazed, box-type solar oven with reflector fabricated using locally available materials. The experimental solar cooker consists of an aluminum absorber plate painted matte black and a double-glazed lid. The results illustrate that the cooker has a good reliability for cooking food and boiling water.

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