



# Impact Evaluation of Improved Stove Usage – The Role of Behavior

## Experiences and Outlook



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## Background: Behavior and Evaluation

- People do not act as one expects them to act
- “Behavior” causes the gap between *a priori* assumptions and effective observations in the field

 “Behavior” is in many cases the reason for surprising evaluation results

# Large survey field experiments

## RESPIRE

Guatemala  
(Kirk Smith et al.)



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High quality biomass  
chimney  
(100-150 US\$)

High

Yes

## Up in Smoke

Orissa/India  
(Hanna/Duflo/Greenstone)



© Hanna/Duflo/Greenstone

Simple biomass chimney  
(15 US\$)

Low/medium

Yes

## Jambaar/GIZ

Senegal  
(Bensch/Peters)



© Bensch/Peters

Simple biomass,  
no chimney  
(10 US\$)

Low

No

**Stove**

**Monitoring  
intensity**

**Health effects  
expected**

# Large survey field experiments

## RESPIRE

Guatemala  
(Kirk Smith et al.)

- Usage rate of 100%
- Virtually all meals cooked on new stove
- No maintenance problems (maintenance was done by research team!)
- People cook inside both before and after

Yes

Yes

## Up in Smoke

Orissa/India  
(Hanna/Duflo/Greenstone)

- Usage rate of 70%
- Most meals are cooked on old stoves
- People cease using the stove after one year
- No proper maintenance
- Increased inside cooking

No

No

## Jambaar/GIZ

Senegal  
(Bensch/Peters)

- Usage rates of 95%
- 70 % of meals cooked on new stove
- Increased outside cooking
- Women spent less time next to the stove
- Households only stop using stove if it breaks

Yes

Yes

**Impact relevant behaviour**

**Reduced smoke exposure**

**Reduced resp. disease symptoms**

## Lessons Learnt and Research Outlook

- Improved stoves yield *better or worse* results than expected because of users' behaviour
- ➔ In order to understand users' behaviour, large survey based field experiments are required
- Evaluation studies have to be planned carefully
  - Work with researchers with good academic background AND field experience
  - Work with local improved stove organisations that are experienced in the field
  - Mimic the real-world intervention; do not over-monitor the field experiment
  - Use both subjective and objective health measurements in order to benefit from respective advantages
- Big research question: how do simple but adapted (and cheaper) improved stoves compare to “really clean” stoves (gasifier, biogas, LPG...)?

## ■ RESPIRE

- > **Smith, K. R. et al.** (2011). 'Effect of reduction in household air pollution on childhood Pneumonia in Guatemala (RESPIRE): a randomised controlled trial', *The Lancet*, vol. 378 (9804), pp. 1717-26.
- > **Smith-Sivertsen et al.** (2004). 'Reducing indoor air pollution with a randomized intervention design – a presentation of the stove intervention study in the Guatemalan highlands', *Norsk Epidemiologi*, vol. 14(2), pp. 137-43.
- > **Smith-Sivertsen, T., et al.** (2009). 'Effect of reducing indoor air pollution on women's respiratory symptoms and lung function: the RESPIRE randomized trial, Guatemala', *American Journal of Epidemiology*, vol. 170(2), pp. 211-20.

See [http://ehs.sph.berkeley.edu/guat/?page\\_id=22](http://ehs.sph.berkeley.edu/guat/?page_id=22) for a comprehensive list of publications on the RESPIRE study

## ■ Up in Smoke

- > **Hanna, R., Duflo, E. and Greenstone, M.** (2012). 'Up in smoke: the influence of household behavior on the long-run impact of improved cooking stoves', CEEPR WP 2012-008, MIT Center for Energy and Environmental Policy Research.
- > **Grimm, M. and J. Peters** (2012) 'Improved Cooking Stoves that End Up in Smoke? – A comment on Hanna, Duflo, and Greenstone (2012)', *RWI Positionen* No. 52. RWI, Essen.

## ■ Jambaar/GIZ

- > **Bensch, G. and J. Peters (2012)** 'A Recipe for Success? Impact Evidence from a Field Experiment of Improved Stoves in Senegal.' *Ruhr Economic Papers* 325. RWI, Essen.
- > **Bensch, G. and J. Peters (2013)**, Alleviating Deforestation Pressures? Impacts of Improved Stove Dissemination in Urban Senegal. Land Economics, forthcoming.