

POLICY BRIEF for funder “International Growth Centre” (IGC)

Policy Motivation for Research

Our research addresses the low uptake in developing countries of improved cookstoves (ICSs), a technology which has positive health and environmental impacts by reducing indoor air pollution.

The leading killer of children worldwide is acute respiratory infections, a principal culprit of which is indoor air pollution (IAP).^{1,2} Biomass combustion within the household is thought to be the main contributor to IAP.³ Despite the health hazards, half of the world’s population continues to rely on biomass as their primary source of energy for cooking and heating.⁴



Biofuels in traditional cookstoves: branches, leaves, crop waste, cowdung-on-a-stick

Biomass combustion with traditional cookstoves is an important contributor to climate change as well, through the emission of black carbon (“soot”).⁵ Other than carbon dioxide, black carbon is the leading contributor to global warming is black carbon (“soot”).⁶

¹ World Health Organization 2005

² Smith et. al. 2000, Ezzati and Kammen 2001, Ezzati et. al. 2004, Pokhrel et. al. 2005

³ Ezzati et. al. 2004

⁴ World Health Organization 2002, Ezzati et. al. 2004, Health Effects Institute 2004, Pokhrel et. al. 2005

⁵ Rosenthal 2009, Levine and Beltramo 2009

⁶ Rosenthal 2009



Inefficient combustion of solid fuels → high CO and PM emission rates

Strikingly, simple technologies to reduce IAP and black carbon emissions exist, but efforts to promote the adoption of these “improved cookstoves” have often proven ineffective. Given the important intra-household health externalities of ICSs and their environmental benefits, it is important to understand the barriers to adoption in order to market ICSs to target populations.

Policy Impact

Our work will inform policymakers as to how to most efficiently allocate spending to improve the demand for and adoption of ICSs. For example, information obtained about price elasticity of demand will be important to when deciding whether and how much to subsidize the cost of ICSs. Results on the spread of ICS adoption through social networks will help focus the marketing of ICSs to the most relevant individuals. Other results of our research, such as those regarding individuals’ risk preferences and household decision-making structures, help policymakers to build an effective marketing strategy when selling ICSs to households.

Audience

The issue of ICSs has garnered substantial interest from policymakers and NGOs in recent years. In 2010, US Secretary of State Hilary Clinton announced the formation of the Global Alliance for Clean Cookstoves, a multinational initiative backed by governments, NGOs, and private companies, with the goal of adoption of 100 million ICSs by 2020. With over \$60 million in seed funding and a goal of \$250 million over the next 10 years, it is critical for the Global Alliance to be able to effectively allocate this funding to target potential consumers.

We have already submitted some of our findings, together with other lessons from existing literature, to the social marketing subgroup of the Reaching Consumers working group of the Global Alliance. These findings influenced a set of “quick wins,” – strategies which the Alliance can employ immediately to promote ICS adoption and can fully implement within one year.

Implications

With nearly all rural Bangladeshis (120 million people) burning low-quality biomass in traditional stoves, which they procure for little or no monetary cost, it has been challenging to market ICSs. Our research has derived the following lessons which have implications for future policy to improve their adoption:

- Marketing in any given context should address the key demand-side aversions to stove take-up in that context, as determined by careful analysis.
- The gender marketing experiments indicate that women are more concerned with health, and men relatively more concerned with cost in their stove adoption decision. However, women lack unilateral decision-making power, and often converge to the males' decision when we compare responses to initial marketing to ultimate purchase decisions.
- Individuals place more importance on their own experiences than those of opinion leaders, especially if the technology in question is easy to understand.

In our study, most of the respondents were fairly knowledgeable about the hazards of indoor air pollution caused by traditional cookstoves, with 69% stating that IAP is more harmful than dust from sweeping. This means that in this particular context, an information gap regarding the negative health effects of indoor air pollution is not a barrier to ICS adoption, and therefore any marketing campaign focused on highlighting these effects may miss the mark, as individuals are observed to be utility maximizers, rather than health maximizers. This finding bolsters existing literature on the subject, which has found that health information campaigns in general are ineffective at spurring adoption of new technologies in developing countries.

Women prove to be more interested in health-related technologies, while their husbands are more impressed by budget-saving ones. This is apparent when offering free chimney or portable stoves to husbands and wives separately. However, women lack the authority to make purchase decisions when a positive price is charged. Furthermore, the more time women have to learn about their husband's preferences about a new technology, the more their choices converge with their husbands', as evidenced by the difference between women's initial and final acceptance of an ICS. Public policy must therefore try to exploit these differences in gender preferences absent broader changes in decision-making power within the household.

Own experience typically trumps information that potential users gather through other social marketing strategies (such as decisions of village "opinion leaders" on stove purchase). This is especially true if the technology is easy to understand, and once people have more experience with the technology. (For technologies that are more difficult to comprehend, people may rely more on external signals from agents perceived to be more informed). In addition, there is evidence that individuals find it too risky to experiment with new technologies and products. This stresses the need to re-evaluate the use of persuasion techniques that incorporate psychology and marketing research that is more appropriately used for high-risk/high-return technologies.

Brief Summary of Research

We conducted a series of intertwined experiments in rural Bangladesh to estimate the effectiveness of different interventions to promote cookstove adoption: subsidies, providing information about health benefits, marketing targeted to women (who may prefer technologies that differentially benefit their or their children’s health) and to men (who have greater decision-making power), and diffusion of cookstoves through social networks to overcome aversions to changes in traditional behavior.

We offered two technologies with different salient characteristics—a chimney stove that primarily reduces indoor smoke exposure and benefits the cook’s health, and an efficient combustion stove that reduces fuel consumption and benefits the household budget. The use of these experimental conditions allows us to conduct analyses of several behavioral phenomena underlying low demand. For example, offering a choice of stoves for free to husbands and wives separately reveals the true gender difference in preferences over healthy versus budget-saving technologies. Charging men and women for the stoves then allows us to study how intra-household decision-making prevents women from acting on their preferences.



Improved Chimney Stove



Improved Portable Stove

Group	Name	Description	# house-holds
A	Control	Stove offered at full price	600
B	50% Subsidy	Stove offered at half price	500
C	Full Price + OL	Full price stove + households informed of opinion leader adoption decisions	500
D	Half price + OL	Half price stove + households informed of opinion leader adoption decisions	500
E	Men free	Husband given choice of free portable or free chimney stove	200
F	Women free	Wife given choice of free portable or free chimney stove	200
G	Men 85%	Husband given choice of 50Tk portable stove or 250Tk chimney stove	200

H	Women 85%	Wife given choice of 50Tk portable stove or 250Tk chimney stove	200
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Implementation

Our findings suggest three action points in forming policy regarding ICS marketing:

Because we found that individuals continue to use traditional cookstoves despite an awareness of the negative health consequences of the indoor air pollution they cause, any marketing campaign of ICSs should not focus resources on informing the target population about those hazards. Rather, marketing should be tailored to address the specific demand-side aversions present in the target market, as follows in the next two points.

We find that people are risk-averse about new products, and learn more from their own experience than from the experience of or information gained from outsiders. This suggests that offering a warranty risk-free trial period on ICSs would encourage more people to try out the technology, which would then spur continued adoption based on their positive experiences from the improved cookstoves.

Marketing must account for intra-household differences in preferences, with women typically more interested in stoves, but unable to act on their preference when they don't control the household budget. This suggests that bundling stoves with another product or characteristic that men care about might be a promising marketing strategy. One example would be a stove such as the one developed by BioLite (www.biolitestove.com/BioLite.html), which uses its own excess heat to power a cell phone charger or other electric appliances.

Further Reading

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