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EDWARD L. GLAESER

When helpful intentions go up in smoke

April 20, 2012 | By Edward L. Glaeser

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People often dream that better technology can solve the world's most persistent problems. There is, for example, an international movement that wants to distribute cleaner stoves to fight indoor air pollution in the developing world. Reducing carbon monoxide poisoning would have huge health benefits. Yet human foibles often stymie the cleverest engineering. New research shows that the stoves can have little long-run impact on air quality or health because they are underused and often break. It also shows that, in devising solutions to social ills of all sorts, some humility is in order.

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Engineering and economics provide much different approaches to problems. The engineering approach emphasizes new technology and infrastructure. In some cases, like providing clean water, this approach works perfectly well. But in other areas, human behavior comes into play, and bringing in new hardware only goes so far. Close to home, we see this in efforts to reduce traffic by building new highways that soon become congested. (Economists, who often prefer financial nudges, would rather alleviate the problem by charging drivers.)

Abroad, we see well-intended efforts to help the poor failing to serve their intended purpose. The idea of giving laptops to children in poor countries has inspired thousands of donors, but a recent Inter-American Development Bank report suggests the educational benefits have been limited. Conversely, new technologies that are driven by local demand, such as cellphones in coastal India, have proven highly useful, even transforming local economies.

Which brings us back to stoves. The World Health Organization notes that indoor air pollution from primitive cooking fires contributes to 2 million deaths a year. Betting that new stoves offer the promise of better health, and lower carbon emissions, the US government has committed millions of dollars to the Global Alliance for Clean Cookstoves, which aims to induce 100 million homes to adopt better stoves by 2020.

A randomized experiment in Guatemala supports this effort. This trial gave poor households special chimney stoves. Field workers inspected the stoves weekly for proper use and ordered repairs as needed. Under these circumstances, carbon monoxide exposure was about 50 percent lower in the randomly selected sample that received the stove.

This study is good, important research, but how widely applicable is it? The stove's cost, over \$100, is high for communities where annual incomes are below \$200. And the weekly visits to ensure proper use and maintenance seem infeasible on a big scale.

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Yet the idea of promoting new stoves has gathered a momentum of its own. A new paper by my colleague Rema Hanna and two MIT co-authors, Esther Duflo and Michael Greenstone, looks at an initiative that distributes cheaper (\$12.50) stoves and skips the weekly visits. An esteemed nongovernmental organization in Orissa, India, distributed the stoves to a randomly selected treatment group and provided training. During the first year, the stoves reduced carbon monoxide exposure, at least for the household's primary cooks. By the third year, though, there was no relationship between receiving the stove and better air quality. Nor was there any discernable effect on recipients' health.

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Why did the stoves have such a small impact? For one thing, people were still using their old fires to cook most of their meals. Plus, the stoves started accumulating maintenance problems that didn't get fixed, and households reported spending hours repairing the new stoves. The old technology was dirty, but it was easy to operate and didn't break, and so people stuck to that.

The Hanna paper doesn't imply that we should give up trying to improve indoor air quality — but it does mean we need to think about behavior as well as technology. Dumping stoves into the developing world isn't going to alter the long-standing advantages of traditional methods. If we want to help people in poor countries, our engineering skills alone won't be enough.

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