

Source: Jibon Ahmed.

## BANGLADESH OFFERS MODEL OF SUCCESSFUL CLEAN COOKING PROGRAM

ESMAP helped to identify and implement a successful market model for Bangladesh's improved cookstoves program by building on successful models within the country, partnering with the local development-finance institution, and tapping into a network of local nongovernmental organizations to manufacture and distribute cleaner, more efficient cookstoves. The program has distributed nearly 1.7 million improved stoves and reduced greenhouse gas emissions by 3 million metric tons of CO<sub>2</sub> equivalent. By project close, the program expects to reach 4 million households and reduce greenhouse gas emissions by a total of 10.5 million metric tons of CO<sub>2</sub> equivalent.

## CLEANER COOKING, CLEANER AIR

The World Health Organization estimates that indoor air pollution, created when wood fuels are burned in traditional cookstoves, kills more than 4.3 million people each year. Women and children are disproportionately affected, both because they inhale most of the carbon monoxide and particulate matter emitted by traditional cookstoves, and because they carry the burden of collecting wood, charcoal, coal, animal dung, or crop waste to fuel them.

The estimated health, environmental, and economic costs are staggering: **US\$1.5 trillion annually**.<sup>1</sup> The collection of wood fuels is a major contributor to deforestation in many parts of the world and the greenhouse

### ESMAP Has Mobilized Much of the World Bank's Lending Portfolio for Clean Cooking

The World Bank's **US\$350+ million** lending portfolio spans **21 countries**, including Bangladesh, China, Djibouti, Ethiopia, Kenya, the Kyrgyz Republic, Mongolia, Senegal, and Uganda.

Programs under this portfolio are benefitting **over 3.6 million households—over 18 million people—with improved access to more efficient, cleaner cooking and heating solutions.**

\*From the ESMAP Annual Report 2018



Source: Jibon Ahmed.

<sup>1</sup> World Bank. 2016. The Cost of Air Pollution: Strengthening the Economic Case for Action (English). Washington, D.C., World Bank Group. <http://documents.worldbank.org/curated/en/781521473177013155/The-cost-of-air-pollution-strengthening-the-economic-case-for-action>

gas emissions amount to a gigaton of CO<sub>2</sub> per year—approximately 2 percent of global emissions.

The development community has been working to mitigate the impacts from traditional cookstoves for nearly three decades, but with limited success. Poor, often rural, consumers lack awareness about the adverse effects on their health and traditional cooking methods are deeply embedded in culture. Even when consumers are knowledgeable about the risks and willing to adopt a new method of cooking, they often lack the resources to pay for cleaner and more efficient cookstoves and fuels.

The World Bank's Energy Sector Management Assistance Program (ESMAP) is trying to change this. ESMAP is helping to embed and scale up clean cooking programs across World Bank operations through a multifaceted approach combining innovative market-based strategies, efficient stove technologies, better affordability, development of supply chains, and a focus on consumer behavior. ESMAP support to a rural energy project in Bangladesh is an example of this strategy.

## A MARKET FOR CLEANER COOKSTOVES

Traditional polluting cookstoves are widely used in Bangladesh, especially in rural communities. Indoor air pollution affects 145 million people, causing 78,000 premature deaths per year—70 percent of these are children under 5 years of age. The government of Bangladesh has collaborated with global partners and donors on several programs to address this issue since the 1970s. Yet, despite these efforts less than 5 percent of households had access to an improved cookstove in 2010.

Market intelligence was lacking to help the government understand the driving forces of transitioning households to cleaner, more efficient cookstoves. In 2010, ESMAP completed a study that found that an improved cookstove program could be successful in Bangladesh if based on a market-driven model that would allow for the growth of entrepreneurs and micro-enterprises across the value chain through intensive training.

The study reviewed local, ongoing household energy programs and international experiences on improved cookstoves, drawing lessons learned from successful programs. It also gathered best practices on developing

local partnerships from Bangladesh's sanitation program, which had achieved remarkable success in delivering improved sanitation throughout rural Bangladesh by leveraging a network of nongovernment organizations (NGOs).

Based on this analysis, the study proposed a market model that introduces training and incentives to encourage local NGOs and entrepreneurs to produce, promote, and distribute improved cookstoves. The market model and other findings from the study were discussed with an array of stakeholders such as government officials, practitioners, entrepreneurs, donor representatives, and NGOs to build consensus on next steps.

The study formed the basis for the design of the Improved Cook Stove Program under the World Bank's Rural Electrification and Renewable Energy Development II (RERED II) Project.

## TAPPING INTO A NETWORK OF LOCAL NGOs AND INFLUENCERS

Building on the successful model, for sale and distribution of solar home systems implemented under the first Rural Electrification and Renewable Energy Development Project (RERED), and the implementation model of the improved sanitation program in Bangladesh, the Improved Cook Stove Program utilized NGOs to produce, promote, and distribute clean and efficient cookstoves.

**Clean cooking solutions: Technology that improves indoor air pollution in a measurable way. Cooking solutions with low particulate and carbon monoxide emissions levels.**

**Improved cooking solutions: Technology that reduces indoor air pollution, regardless of whether there are measurable impacts on health. Cooking solutions that reduce adverse health, environmental, or economic outcomes from cooking with traditional solid fuel technologies.**

The improved cookstoves—which emit 90 percent less carbon monoxide, require 50 percent less biomass fuel, and include a chimney that further reduces indoor

air pollution—are made by local entrepreneurs using locally procured raw materials. This has strengthened rural supply chains and boosted jobs in rural communities. The improved cookstoves also reduce cooking time by approximately half, freeing women and children from the time burden of collecting firewood for cooking.

The NGOs that promote and sell the improved cookstoves are financed under a microcredit scheme by the Infrastructure Development Company Limited (IDCOL), a government-owned development-finance institution. By leveraging the capacities of NGOs, the program has contributed to strengthening the commercial market for clean cooking solutions.

Designed around a results-based financing framework, the NGOs are funded based on their performance, with payouts for sales based on a variable scale. This has led to an alignment between incentives and sales increases, ensuring that only cookstoves that suit customer preferences are manufactured and distributed. The program also supports local NGOs in establishing their own production centers closer to market and in partnering with the local entrepreneurs to improve their production capacity according to technical specifications of IDCOL.

The program utilized marketing techniques from the private sector to reach out to local communities to raise awareness about the benefits of the improved cookstoves. Village influencers and early adopters were identified and encouraged to spread messages about the fuel saving and health benefits of the improved cookstoves. The multilevel awareness creation campaign works through village meetings, rural folk songs, rural product displays and exhibitions, and user trainings.

IDCOL also hosts monthly committee meetings, bringing together the development partners and the NGOs. These meetings serve as open platforms for honest discussions on the program, including challenges and success stories.

## IMPLEMENTING STANDARDS TO IMPROVE EFFICIENCY

The Clean Cooking Alliance provided expertise on stove technology and fuels, impact assessments, and marketing strategies. Once performance standards were established, labels identified the standards met by



<https://www.worldbank.org/en/news/video/2018/05/08/better-cookstoves-bring-fresh-air-to-bangladeshs-homes>

Source: *The World Bank*.

the improved cookstoves. IDCOL engaged the Bangladesh Atomic Energy Commission to act as a hub for testing, ensuring the quality of the improved cookstoves distributed under the program. The Bangladesh University of Engineering Technology was also brought in to help design some of the improved cookstove models and act as a standard lab for testing and labeling.

Research and development support under the project resulted in improvements in the locally produced concrete stoves, upgrading the cookstoves to higher levels of efficiency over time.

The cookstoves were tested by the Bangladesh University of Engineering Technology in 2017. They showed over 20 percent reduction in particulate matter and 90 percent reduction in carbon monoxide emissions. The standard field testing deployed by the program, along with the lab testing, offer real-time data on emissions and efficiency.

The Improved Cook Stoves Program, which began in May 2013, distributed one million improved cookstoves by January 2017, almost two years ahead of schedule.

## CREATING OPPORTUNITIES FOR WOMEN

The impacts on women have been particularly significant. Seven of the NGOs selected to carry out the program in rural communities are being led by local women, such as Ms. Jhimi Mondal, who runs an organization that has sold over 130,000 improved cookstoves in the Bagerhat district in Southern Bangladesh since





Source: Jibon Ahmed.

2004. Ms. Mondal often employs poor and disadvantaged women. In total more than 58% of her staff are made up of women, employed in various capacities from senior management to masons.

By supporting local supply chains and working closely with local village influencers and early adopters, the program has boosted adoption rates for the improved cookstoves and created more than 3,000 direct and indirect jobs for women. Women involved in the program are earning an income and reducing poverty levels for their families.

## REACHING BEYOND ONE MILLION STOVES

Based on the success of the program's first phase, efforts have been scaled up. In February 2018, ESMAP helped mobilize additional funding by preparing a proposal to the Green Climate Fund (GCF). In September 2019, GCF committed US\$20 million, along with US\$20 million from the World Bank, in additional

financing, which will help the program reach 4 million more households by December 2021.

This next phase will also introduce higher efficiency and cleaner cookstoves, the first large-scale program to do so. This higher efficiency model uses biomass and biomass waste-based pellets to fuel the cookstoves. Like the cookstoves, the pellets are manufactured by local rural entrepreneurs.

The funding also includes allocations for further quality assurance, as well as training and outreach efforts to ensure continued success.

The program will leverage the carbon credits earned from the installation of one million improved cookstoves to further fund the distribution of the higher efficiency cookstoves. The carbon credits are expected to provide over US\$25 million in funding and will help the program remain sustainable beyond the project end date in 2021.

## A SUCCESSFUL MODEL FOR CLEAN COOKING

As of February 2019, nearly 1.7 million improved cookstoves had been installed under Bangladesh's Improved Cook Stoves Program, reducing the use of firewood by 58 percent and greenhouse gas emissions by almost 3 million Mt of CO<sub>2</sub> equivalent. Over its lifetime, the program is expected to reduce greenhouse gas emissions by a total of 10.5 million Mt of CO<sub>2</sub> equivalent and reach 25 million households.

More importantly, the unique program—which brings together the local development-finance institution and network of NGOs, linking incentives with verified results—has proven to be a successful model for manufacturing, distributing, and raising awareness about improved cookstoves, improving lives in Bangladesh, and offering an example for future World Bank clean cooking efforts.

### ESMAP MISSION

**The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by The World Bank.** It provides analytical and advisory services to low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Canada, ClimateWorks Foundation, Denmark, the European Commission, Finland, France, Germany, Iceland, Italy, Japan, Lithuania, Luxembourg, the Netherlands, Norway, the Rockefeller Foundation, Sweden, Switzerland, the United Kingdom, and the World Bank.