

# From the Lab to the Field and Back

## EXECUTIVE SUMMARY

*Social Context, Gender, and User Needs in the Design and Promotion of Clean Stoves in Indonesia*



### East Asia and Pacific

A product of the EAP Gender and Energy Facility and the Clean Stove Initiative



Important progress has been made in recent years in developing a range of biomass cookstoves that reduce pollutant emissions and burn fuel more efficiently. These improved stoves have the potential to improve health and enhance the quality of life for the 2.5 billion people worldwide who still cook their meals and heat their homes by burning biomass in open fires or inefficient traditional stoves.

Despite substantial efforts, however, the rate of adoption of clean stoves has remained low. Studies confirm that failing to meet the needs and preferences of intended users is a key obstacle to adoption.

### To Deliver Health and Environmental Benefits, Clean Stoves Must First Meet Users' Perceived Needs

To make clean stoves more responsive to the particular needs of women, who are their main users, and to improve understanding of how gender and social dimensions can be incorporated into clean stove efforts in Indonesia and beyond, the World Bank, in collaboration with the Directorate of Bioenergy within Indonesia's Ministry of Energy and Mineral Resources (MEMR), launched the Indonesia Clean Stove Initiative (CSI) in 2012.



*Typical baseline biomass stove and kitchen in Central Java*

The Indonesia CSI invested in experimental approaches to better understand end users' needs and preferences and to assess the performance of technologies and products in their intended context of use. The goal of this work has been to shed light on the social and cultural aspects of technology adoption as complements to technical performance tests on emissions and thermal efficiency. The overall objective of the work has been to make clean stoves more responsive to the preferences of end users, thus increasing the probability that the stoves will actually be used widely over time.

Approximately 25 million households in Indonesia rely on biomass as their primary cooking fuel—85 percent of them in rural areas. An overwhelming majority use traditional stoves with very high fuel consumption, low combustion efficiency, and high levels of pollutant emissions. Various initiatives for the diffusion of improved stoves have been initiated since the 1980s, but these have remained dispersed and small in scale, and uptake of clean stoves has been limited.

In 2012, the Indonesia CSI established a team of social scientists that included a sociologist, an anthropologist, and a statistician supported in the field by a local NGO that had several decades of knowledge on biomass stoves in Indonesia. The team conducted qualitative research in more than 200 households on Sumba Island and in Central Java, including in-depth interviews, focus group discussions, and case studies. To validate the qualitative findings a survey of more than 1,400 peri-urban households outside Yogyakarta City, Central Java, explored cooking fuel consumption, biomass cookstove preferences, and cooking habits. This work was described in three background papers (box 1).

Using the information gained during this initial sociocultural exploration, a social protocol for clean stove testing was developed, tested and validated on various locations in Central Java.

To develop the protocol, data was obtained on patterns of fuel use and user segments, stove inventories, cooking practices and sequences, preferences, gender roles, and innovation patterns.

Following the selection of a group of clean stoves that passed the CSI's technical tests for emissions and efficiency, an experimental procedure was developed to assess the actual performance of the selected stoves on parameters of interest to end users under real-life conditions. The emphasis was on obtaining comprehensive and systematic user feedback on stove performance in context, actual stove usability, and user satisfaction. The testers were experienced local household cooks using biomass as primary fuel. The approach was tested in Central Java in December 2014 and validated in May 2015.

The development and application of the social protocol are reported in a synthesis report, two guidance notes and a set of tools (box 1).

**BOX 1.****Publications from the Indonesia Clean Stove Initiative**

The publications of the Indonesia CSI include this summary, a synthesis report, two short guidance notes on user needs and gender integration, a toolkit for the assessment of user needs, and three background papers. All are available from <https://www.astae.net/publication/social-gender-support-to-indonesia-CSI>.

**Synthesis report**

The synthesis report provides a synoptic view of the design and execution of the Indonesia Clean Stove Initiative, with recommendations on the design, testing, and promotion of clean stoves and on holistic approaches to reducing exposure to indoor air pollution.

**Guidance notes and tools**

The two guidance notes provide a description of the design and application of the new protocol for testing clean stoves and explore gender patterns in fuel collection and food preparation, with specific reference to the acquisition and use of clean stoves.

The toolkit contains instructions and forms for use in conducting assessments of clean stoves in their social and gender context.

**Background papers**

“Stoves, Fuels, and Cooking Practices on Sumba Island, Indonesia: Findings and Recommendations of Qualitative Field Research,” a report of interviews, focus groups, and participatory observations of cooking practices, users’ perceptions of available stoves, and cultural roles (including gender) carried out in December 2013 with a small sample of villagers in a poor and sparsely populated region of the country.

“Stoves, Fuels, and Cooking Practices in Central Java, Indonesia: Findings and Recommendations of Qualitative Field Research,” a similar investigation with a slightly larger sample carried out in a more populous and affluent area in December 2012 and March 2013.

“Clean Biomass Cookstoves in Central Java, Indonesia: A Quantitative Market Analysis,” a quantitative survey of cooking habits and preferences of households in peri-urban areas around Yogyakarta City in the Yogyakarta Special Region of Central Java in August–October 2013. The analysis complemented the qualitative field research carried out in Java and Sumba Island in 2012–13.

The findings from this initial experience suggest that adding a second layer of social assessment to complement technical tests can help to identify potential technical as well as contextual limitations and opportunities prior to efforts at large-scale product dissemination.

## Program Achievements

Understanding of the gender and social aspects of clean stove promotion and use has been significantly increased through the Indonesia CSI.

By incorporating local cooking practices and social/cultural preferences based on anthropologist studies and comprehensive household surveys, the stove testing method developed and introduced under the program has improved understanding of how gender and social dimensions can be strategically addressed in clean stove initiatives. For that reason it has generated significant interest within the larger clean stoves community, and aspects of it are being integrated into global discussions of stove testing within the International Organization for Standardization.

Meanwhile, stoves tested in the Indonesia CSI are being redesigned to better respond to users' needs using feedback from the tests conducted under the program, and stove



Photo: Septiyah Widyaningsih

operation manuals have been prepared based on inputs from stove users, thereby contributing to the update of the stoves.

Through the development of the social stove testing protocol and the background studies, the Indonesian government, key nongovernmental organizations, and the broader Global Alliance for Clean Stoves have gained a deeper understanding of how gender and social issues affect the uptake and use of clean stoves and of how stoves can be improved to better correspond to users' needs and concerns.

The recommendations generated by the program are detailed in table 1.

It is expected that recommendations on stove design and testing will be carried on by stove designers in Indonesia. The integration of social and gender aspects into laboratory testing will be carried forward by the ISO.

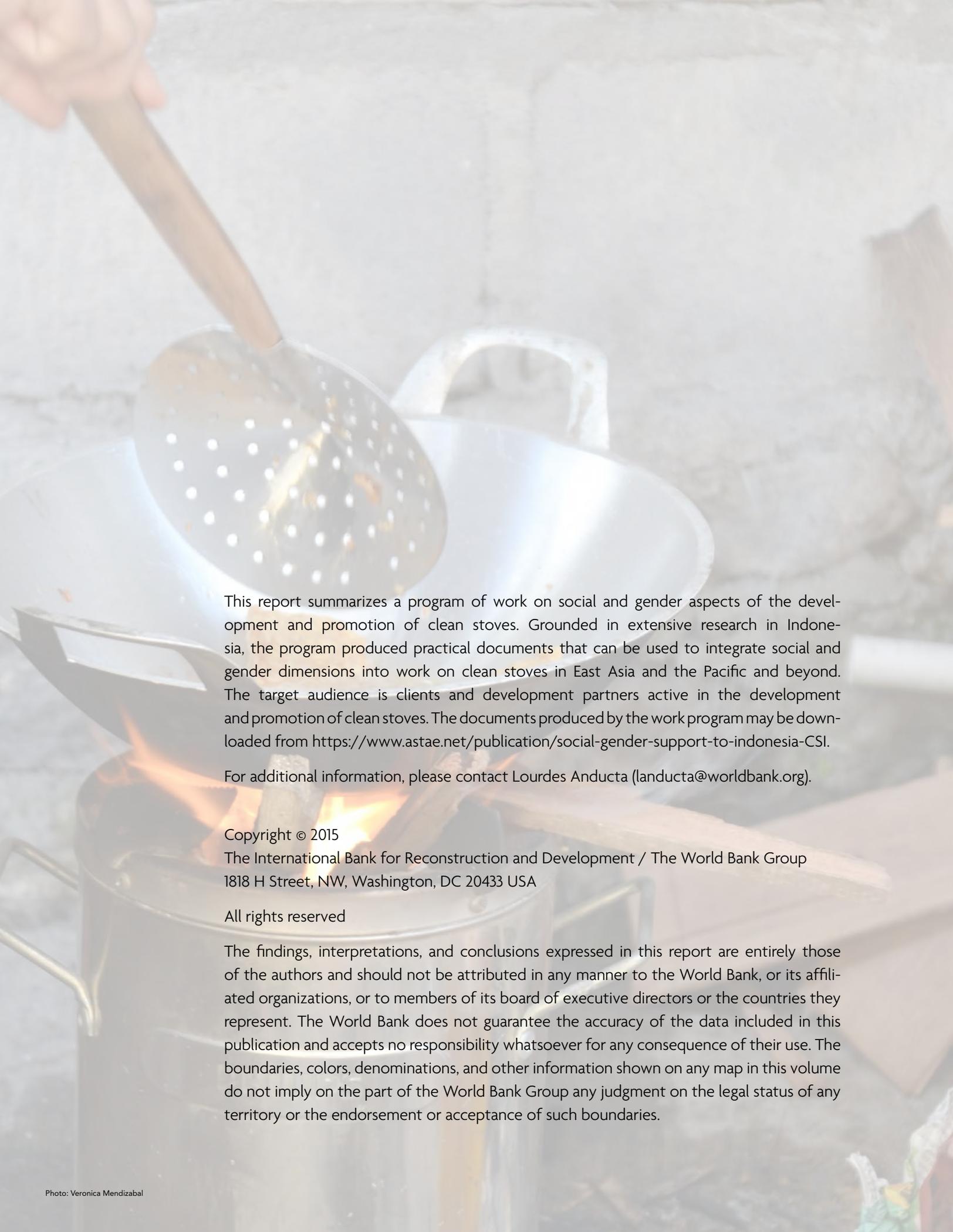
The program's recommendations on stove promotion are expected to continue through the EAP Gender & Energy Facility, a World Bank–managed trust fund, which will also continue to disseminate the lessons emerging from the program.



Photo: Veronica Mendizabal

**TABLE 1.**  
**Summary of Recommendations**

<b>Recommendations on stove design</b>	Integrate the interests of consumers in the design of improved stoves; move from supply- to demand-based stove technology
	Address the differentiated preferences of women and men
	Assess the level of improvements in areas of interest to users
	Ensure functionality
	Simplify to increase usability
	Use feedback mechanisms to improve design, distribution, and outreach
<b>Recommendations on stove testing</b>	Invest in understanding local cooking practices
	Determine and define cooking cycles and incorporate these in the lab testing protocol
	Conduct social adoption tests and feed the results back into testing protocols
	Share results with stove designers and promoters
<b>Recommendations on the promotion of clean stoves</b>	Address the differentiated needs of rural and urbanized populations; consider prioritizing areas that have been exposed to a diverse range of fuels and devices
	Ensure that the pricing structure responds to the purchasing power of the target groups and to the scope of women's power to make purchasing decisions
	Consider conducting a gender audit of selected stoves
	Engage community groups in promotion
	Conduct awareness-raising campaigns
	Involve men/husbands
	Target additional consumer groups beyond household consumers
<b>Recommendations on holistic approaches to reduce exposure to indoor air pollution</b>	Use mutually enhancing solutions to increase the impact of work on clean stoves
	Explore the potential of supporting fuel diversification
	Monitor and evaluate impacts
	Continue to develop the CSI social testing protocol



This report summarizes a program of work on social and gender aspects of the development and promotion of clean stoves. Grounded in extensive research in Indonesia, the program produced practical documents that can be used to integrate social and gender dimensions into work on clean stoves in East Asia and the Pacific and beyond. The target audience is clients and development partners active in the development and promotion of clean stoves. The documents produced by the work program may be downloaded from <https://www.astae.net/publication/social-gender-support-to-indonesia-CSI>.

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