



IOB Evaluation Newsletter

13 13

Impact Evaluation of Improved Cooking Stoves in Burkina Faso

g Stoves in Burkina Faso | IOB Evaluation Newsletter # 13 13 | Impact Evaluation of Improved Cooking Stoves in Burkina Faso | IOB Evaluation Newsletter # 13 13 | Impa

About 2.5 billion people in the world rely on the traditional use of biomass, mostly firewood, for cooking. Although improved cooking stoves (ICS) have been promoted for decades, there is renewed international attention for the importance of stoves as a low-cost solution to contribute to maintaining biomass resources, to the reduction of greenhouse gases, to improving indoor air quality, to relieving the daily workload of women and to reducing expenditure for energy by poor households.

IOB evaluated the impact of the use of fuel wood efficient stoves at household and at enterprise level as promoted by the ICS programme in Burkina Faso (FAFASO). IOB published the results in the report

Impact Evaluation on Improved Cooking Stoves in Burkina Faso. The study shows that the market-based approach pursued by FAFASO has been successful in encouraging ICS ownership in the two largest cities of Burkina Faso. Significant savings in fuel wood have been obtained as a result of using ICS. However, both households and enterprises save less fuel wood than potentially possible and hence impacts on expenditure, workload and health are less than expected.

Background FAFASO

The Improved Cooking Stoves (ICS) programme *Foyers Améliorés au Burkina Faso* (FAFASO) was established in 2005 and funded by the Dutch-German partnership Energising Development (EnDev). Between 2006 and 2013 the implementation was supported with EUR 2.8 million.

The main objective of FAFASO is 'to provide access to modern cooking technologies to the urban and rural population with the aim to reduce the pressure on wood energy'. Through FAFASO, EnDev supports the development of a sustainable market for the dissemination of ICS for domestic use, productive use (for example shea butter, beer brewing) and in social institutions (schools, health centres).

In contrast to earlier ICS promotion programmes in Burkina Faso, FAFASO does not provide direct subsidies (on the price) but supports the training of producers (whitesmiths and potters), the establishment and organisation of producer associations, advertisement campaigns and awareness raising, and the organisation of quality assurance.

Methodology

The report *Impact Evaluation of Improved Cooking Stoves in Burkina Faso* is one of the studies that underpin the policy evaluation of the Promoting Renewable Energy Programme (PREP) to be published in 2014.

IOB has commissioned several impact studies of renewable energy projects funded by PREP. These impact evaluations have been commissioned to a consortium integrated by the German *Rheinisch-Westfälisches Institut für Wirtschaftsforschung* (RWI) and the Institute of Social Studies (ISS) at Erasmus University Rotterdam in the Netherlands. In Burkina Faso two impact studies were conducted: one concerning the impact of the use of ICS by urban households and one on the impact of the use for production, in this case brewers of local beer (*dolo*).

For both studies qualitative and quantitative techniques were applied. The study concerning ICS at household level applied a cross-sectional approach, whereby matching techniques paired each household using an ICS to a statistically comparable household that does not use an ICS. In total 1,473 households were surveyed in Ouagadougou and Bobo-Dioulasso between January and March 2011. For the study among beer brewers use was made of a baseline study and a follow-up survey two years later. In 2010, 219 brewers were interviewed; in 2012, 261.

In both studies, the main impact indicator was the firewood consumption. The study about the use of ICS by households looked at health, time use and expenditure. Since women are generally

primarily responsible for cooking in the household, data were disaggregated by gender. Traditionally, beer brewing is done by women only.

FAFASO is cost effective

To the urban household, buying a Roundé stove is a profitable investment. Savings in firewood (on average EUR 1.42 monthly) enable the amortisation of the investment in 2.5 to 4 months. The Energising Development programme strives to keep the programme cost relatively low, that means below EUR 20 per beneficiary. FAFASO, a project funded by EnDev remains far below that target with an average cost of EUR 5 per beneficiary. Considering its results described above, it is a cost-effective project.

Effectiveness

The project had set targets for the uptake of improved stoves by households. These targets were reached and passed easily. ICS for domestic use are being produced, traded and retailed thanks to direct linkages established among producers, retailers and customers. Of all households in the surveyed areas of Ouagadougou and Bobo-Dioulasso, 9.6% own an ICS certified by FAFASO (the Roundé stove). This coverage is less than calculated on the basis of the total number of stoves sold by supported producers and retailers in the two cities. Among the various explanations possible, the most likely one is that stoves sold in the cities are retailed and used in other areas, mostly small rural townships.

Photo 1 ICS Roundé label



Regarding Roundé stoves for breweries, over 2,300 stoves were built in the first quarter of 2013. Currently, about half of all breweries in Ouagadougou and surroundings (49%) and in the urban area of Bobo-Dioulasso (54%) own an ICS. Although this may suggest that there is still scope for expansion, in practice the uptake of ICS has shown a decline since 2012. Most likely this reflects the

fact that the larger breweries have already acquired an ICS, while to smaller breweries an ICS is perceived as less attractive due to the cash outlay required for both the purchase and maintenance costs.

Among the owners of a domestic Roundé ICS, 85% is actually using it, a high percentage as compared to areas where stoves were distributed for free in the past. To 37% of ICS owning households, the ICS has become the single most often used cooking stove, while for another 16% of the households, the ICS is the most often used stove, next to other stoves used equally frequently (together 53%). Among these 'other stoves' figure the locally produced imitation ICS that are cheaper, but of less quality.

Most of the local brewers (57%) produce the beer (*dolo*) using a single stove. Among the breweries that produce with more than one stove and own an ICS, 85% uses the improved stoves.



Photo 2 A beer brewster busy making dolo in large cooking pots on a clay stove

Impact

Significant saving in the use of fuel wood

The savings in firewood obtained by using a Roundé stove are significant, substantial and robust. For domestic use, in daily practice, a fuel efficiency of 10-30% over other cooking devices is achieved. Breweries save 36-38% in firewood by using an ICS. In both cases however, these savings are less than indicated in Controlled Cooking Tests, which showed fuel efficiencies of 29-43% for the domestic ICS, and up to 60-70% for ICS for beer brewing, as compared to three-stone stoves.

Households save on average 3.5 kg of firewood per week or 1.9 kg of charcoal if they use an ICS. This equals up to 2,660 tons of firewood and 1,535 tons of charcoal per year in Ouagadougou and Bobo-Dioulasso together. To beer brewers the fuel efficiency of the Roundé stove represents 42 kg of firewood per brewing. Assuming that the 2,300 breweries that currently use an ICS would brew twice a week during 40 weeks per year, together they would save 7,700 tons of firewood annually. Adding the savings in firewood of productive ICS to those of domestic use, the ICS do generate substantial savings in absolute terms (some 15,000 tons of firewood per year) but these represent less than 1% of total firewood consumption in Burkina Faso.

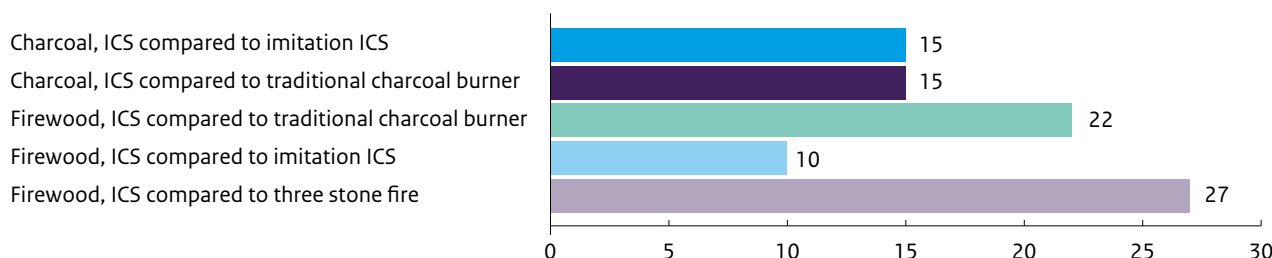
An aspect that compromises fuel efficiency by households is the fact that owners of an ICS tend to change cooking behaviour. The savings in fuel wood consumption may entice more cooking or having warm water the entire day (the 'rebound effect'). By doing so, the effect of fuel efficiency is partly nullified by the intensified usage of the cooking device.

In the case of beer brewers, the potential level of fuel efficiency is compromised by strong traditions regarding the brewing process. Guided by these traditions, a brewer or her assistants who switched to an ICS may continue feeding the stove with large trunks, as they have always done. These trunks may damage the door of the stove, or overheat the cauldron, and in general lead to a sub-optimal use of the combustion qualities of the improved stove.

Financial savings below expectations

The reduced use of firewood implies a 12% financial saving on expenditures for fuel for cooking. These savings correspond to EUR 1.42 per month, which is below the expected EUR 5 at the start of the programme. On average the expenditure for fuel for cooking represents approximately 8% of the total household budget (in the lowest income bracket this is 16% and in the highest income bracket 2.3%).

Figure Fuel saved (in percentage)



The Policy and Operations Evaluation Department (IOB) of the Ministry of Foreign Affairs carries out independent assessments of the efficiency, effectiveness, relevance and consistency of Dutch foreign policy. It thus provides accountability concerning the results of policy, as well as information to enhance policy.

The quality of IOB's assessments is guaranteed by means of systematic and transparent procedures.

All IOB evaluations are in the public domain and are brought to the notice of parliament. IOB also seeks to make evaluations accessible to the Dutch public and to partners in the countries concerned. Reports can be freely obtained and a summary of the most important findings is published in the form of the IOB Evaluation Newsletter.

IOB Evaluation # 388 (November 2013)

Impact Evaluation of Improved Cooking Stoves in Burkina Faso

ISBN: 978-90-5328-449-0

Downloadable from: www.government.nl/foreign-policy-evaluations

IOB Evaluation Newsletter # 13 13 | *Impact Evaluation of Improved Cooking Stoves in Burkina Faso* | IOB Evaluation Newsletter # 13 13 | *Impact Evaluation of Improved Cooking Stoves in Burkina Faso*

Hence, the approximately 1-2% reduction in total household expenditures cannot be expected to have any significant implication for alternative household spending on for example education or health.

No impact on health

The Roudé is designed to obtain fuel efficiency and not directly to reduce the exposure to smoke (it does not have a chimney). Most households in Burkina Faso cook outside, which already contributes to decreasing the exposure of the cook to indoor air pollution. Since there is no noticeable change in exposure to smoke, no health effects can be determined.

Modest time savings

In the urban areas firewood collection is virtually inexistent. Both firewood and charcoal are either delivered at home by retailers or purchased at markets nearby the house. Only 2% of the breweries collect fuel wood. Among the surveyed households, the savings in total cooking duration vary between 7 and 18 minutes per day, depending on variables like the combination of stoves and number of dishes cooked. In the breweries the time used for brewing remained unaltered, since this is in practice determined by the fermentation process and by tradition.

Conclusion

The sustainability of the markets for improved stoves seems high, but cannot be ascertained yet, as long as FAFASO supports the market. Next to the Roudé stoves, imitations are produced and sold. Often customers do not recognise quality differences in terms of efficiency-enhancing characteristics while purchasing stoves. Imitation ICS are also fuel efficient, albeit (much) less than the Roudé, and offered at a competitive price, making the imitation ICS an attractive alternative to households with a smaller budget to spend.