



CASE STUDY - Senegal

Baking Ovens: Improved Hybrid Ovens Using Gas/Woodfuel

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Summary

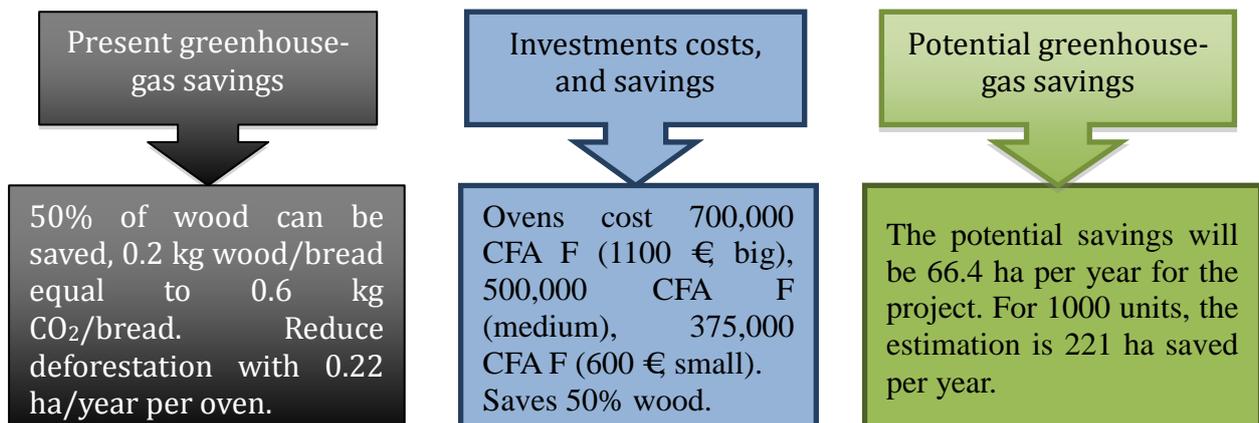
Faced with the need to find alternative solutions to achieve fuel savings and to reduce the ecological footprint of the value chain of traditional bakeries, ENDA Energy, Environment, Development initiated an outreach programme for improved ovens that can run on LPG, woodfuel, charcoal and biogas in traditional bakeries and through a research-action-training-coaching approach. The objective of the dissemination of improved mixed gas / wood / biogas ovens is to develop and make available economic models of improved ovens and to ensure energy conservation for food sovereignty as well or to strengthen the resilience of SMEs to address the impacts of climate change.

In terms of energy consumption, traditional ovens face two major constraints. On the one hand, they consume a large amount of wood (0.4 kg of wood per loaf of 35-40 cm, representing 30% of the cost of bread); and secondly, the furnace temperature is estimated empirically.

The improved metal oven is composed of two parts, a fireplace that acts as the combustion chamber and the baking chamber. The proposed metal oven has several advantages:

1. the existence of three different models as needed or requested by the business-men. All the models can be adapted to run with wood-fuel (wood, charcoal), butane gas, or biogas.
2. Ability to control the temperature (thermometer). With these ovens, the cooking temperature can be limited to 200° C for a savings of 50% of firewood compared to the traditional ovens (0.2 kg of wood per loaf of bread) and cooking time is reduced by more than 30%. Thus the avoided deforestation can be estimated to 0.22 ha per year per oven at least.

The two-year program of ENDA aimed a diffusion of 300 ovens to 300 economic operators. These are collective or individual operators. Beyond these, the program also explored community centers such as 'daara' and schools with boarding.



Presentation of the Case Study and the Context

Traditional bakeries are widespread in Senegal. They are run with wood as fuel and compete even with modern bakeries in some urban centers.

In 1977, in order to protect the investment of modern bakeries, and promote the establishment of new bakeries in the region, as well as to fight against desertification, a bill (77-38) was passed to prohibit the establishment of traditional bakeries in towns of over 10,000 inhabitants. It is clear that this prohibition is not fully complied with and it would be rather wiser to try to 'modernize' those traditional bakeries by promoting improved ovens. This is possible and would have an even larger impact in terms of environmental protection and reduction of GHG emissions.

A large number of traditional bakeries are spread across all regions (Kaolack, Kolda, Fatick and Tambacounda, etc.) and it is difficult to identify them all. They involve a large number of women.

In addition to the production of bread, the proposed metal ovens are also a technological opportunity for active roasters in the field of peanut butter, cashew nuts, sesame, coffee, etc.

Thus, compared to roasting specifically, the potential is estimated at more than 50 economic operators interested in baking in each major city, and around 20 in other areas. Hence, a potential market exists of more than 200 models of small marketable ovens for the pilot phase.

This technology can also be used to develop local pastry which is an important market segment, since these types of ovens can be an alternative due to lower expenses.

Most ovens used in traditional bakeries are built of clay with a dome resting on a flat surface, which constitutes the table. In some bakeries, this flat surface has been modified and replaced by a tile system to retain heat longer.

With conventional ovens, bakers are always exposed to smoke, and sanitary conditions are not always met to optimize product quality. The sale of finished products is based on a chain of resellers installed in some surrounding villages and at daily or weekly markets. In general, each baker operates in isolation, facing the professional constraints individually.

This programme aims to promote access to a type of oven that is greatly improved: the metal box can have several compartments, and can take various alternative energy sources (wood, charcoal, biogas, LPG). Given the costs of ovens available, the financial barrier may be partially lifted by the involvement of micro-finance institutions. And to facilitate the adoption of these ovens and increase the number of users, funding mechanisms have been designed with micro-credit for women's groups in the framework of this programme of ENDA.

Socio-Economic impact:

Improves bakeries and reduces their wood use, which in turn improves the situation for bakery owners.

Environment impacts:

Reduces wood use that reduces deforestations and therefore also CO₂ emissions. Reduces local air pollution because of reduced wood use and better combustion

Analysis of the Effects of the Outreach Programme on Development and the Fight Against Poverty

Reducing the consumption of wood fuels and replacing them with new improved baking ovens contributes significantly to the preservation of the environment. Moreover, the large-scale popularization of this oven will modernize and formalize the traditional bakery sector. It will especially help create jobs for rural youth and slow down the rural exodus.

Thus, the socio-economic impacts associated with the introduction of improved ovens can be felt on many levels. Women are very involved in the management and operation of traditional bakeries in most regions of Senegal. The adoption of improved efficient firewood stoves allows savings on energy as well as gains on productivity. With the use of these ovens, heating and cooking times are reduced significantly (about 30%), resulting in savings for managers. Thus, these savings allow women managers of bakeries to have a higher profit margin for their families. In terms of climate change, the ovens-dissemination programme can achieve fuel savings, reduce environmental footprints of the value chain, and achieve energy conservation in a context of enhancement of resilience to climate-change impacts.



Photo: An example of a traditional baking oven

Perspectives

The pilot program of dissemination of improved ovens has good prospects because of the demand for bread is increasing and due to the rising prices of raw materials in the economic crisis. Rural exodus is raising more and more populations in the urban areas or suburbs of Dakar, and these populations require the type of bread called "Tapalapa" made by traditional bakeries. So there are real possibilities of popularization of these ovens not only to bakers, but also to the roasters. Until recent years, traditional bakery was an economic activity that was undertaken most in areas that were remote from Dakar. The growing consumer interest in the improved ovens offers business opportunities for operators of traditional bakeries, many of which exist today in Dakar. Although a comprehensive survey has not been made, we can estimate that it is possible to go beyond the initial target of 300 ovens to disseminate, and target to disseminate, 1000 to 1500 units across the country.

To achieve this target for the improved ovens, a communication plan and training in management for the target audience has been established and will be strengthened. A partnership framework was also developed to ensure production equipment. Finally, the funding mechanism for micro-credits is called upon to facilitate the acquisition of ovens by the target audience.