

# Empowering Women One Community at a Time

**SGP** The GEF  
Small Grants  
Programme



## The Mekhe Solar Cooker

### Project Description

The project aimed to create a model for the sustainable use of renewable energy and regeneration of plant resources. The overall goal was to preserve vegetation through reforestation and the use of solar energy as an alternative to firewood. The project's Technical Advisor, Mr. Abdoulaye Toure, built and introduced the first solar cooker in Senegal in 1990. Currently, he works at the Ministry of Biofuels, Renewable Energy and Research.

The project, which was implemented by the Ndiop Women's Association, benefited from strong support by its stakeholders. The success of this model, as demonstrated in over 50 villages in Senegal, Mauritania and Burkina Faso, led to an SGP partnership with the NGO CRESP, the Eco-village of Ngaye, and GEN Senegal - the first African national Eco-village network. In Senegal alone, more than 11,300 households now benefit from solar cookers which also support micro-enterprises such as bakeries and other food preparation.

### Background

Successive droughts and population growth, led populations of fragile areas like Mekhe to rely heavily on natural resources for firewood, charcoal and livestock survival (e.g., cattle breeding), thereby causing deforestation and forest degradation.

According to a survey done in 2003 by the Centre for Resources for the Emergence of Social Participation (CRESP), consumption of firewood per family results in four hectares of deforestation annually. Due to poverty, 85% of the energy used for cooking comes primarily from wood, causing not only environmental damage, but also chronic respiratory problems among the population.

Mekhe is situated 130 km from Dakar and has a population of 15,291. It consists of 1,699 households divided into 1,241 compounds. There is a slight predominance of women (8,181) over men (7,101). For this reason, the solar cooker initiative was conceived in the area as the target actors were primarily women.



**Implementing Organization:** Ndiop Women's Association

**Location:** Mekhe Village, Thies Region, Senegal

**Duration:** October 2004 – September 2006

**Number of Beneficiaries:** 107 direct women beneficiaries and 1,700 indirect beneficiaries overall

**SGP Contribution:** 49,808 USD

**In Cash Co financing:** 34,567 USD

**In Kind co financing:** 826 USD

**Award and Recognition:**

The neighborhood of Ndiop is now registered as an 'ecovillage', a member of the Senegal Ecovillage Network and Global Ecovillage Network (GEN)

## Implementation

Project implementation relied on the availability, willingness, participation and commitment of its members, particularly women. The problems were clearly identified: deforestation, use of inappropriate energy sources (as financial difficulties make it difficult to access other sources), and insufficient capacity to make informed decisions.

Mr. Abdoulaye Toure, the inventor of the solar cooker, introduced the concept of the solar cooker to the community. A select number of villagers were then trained to produce the cooker. By keeping the production local, the group hoped to increase availability and access to the solar cookers, while also guaranteeing community ownership and sustainability of the initiative. The solar cooker model uses locally produced materials.

Local production was further enhanced by building the community's capacity to promote and market the solar cookers on a wider scale. In order to promote the uptake of the new solar cooking technology, the women's group identified 30 local recipes that can be easily prepared with the cooker and trained 10 select women in the use of solar cookers.

To disseminate the knowledge to larger groups of women five women were trained as trainers. This capacity building exercise prepared the women to use and promote the solar cooking technology effectively.

In addition, the adoption of solar cookers was promoted by subsidizing prizes and developing a micro-credit scheme to finance entrepreneurial activities of the women. With a good monitoring system in place, project leaders provided continued guidance and assistance for maintaining the solar cooker.

The women were also involved in tree planting and community reforestation, which paved the way for the creation of the Centre for Women's Development of Tivaouane. All these activities were replicated.

The success of this project was due to the following activities:

- Raising awareness about the use of renewable sources
- Local manufacture and marketing of solar cookers
- Establishment of a nursery and reforestation activities
- Capacity building of grassroots actors
- Cost-benefit analysis of the use of the solar cooker vs. use of coal and firewood
- Establishment of a micro-credit scheme to finance activities of women

## Environmental Impact

In August 2006, a mid-term survey was conducted with the first group of 44 families that had received the solar ovens on May. The evaluation survey asked families to recall the amounts of different fuel sources that they had used before they received their ovens and to report the amounts of these same fuels that they still were using, in addition to their ovens.

The evaluation found that each family's cooker saved an average 3 metric tones (MT) of equivalent carbon dioxide (CO<sub>2</sub>e), which is the equivalent to 12 trees per year. The first green tags sold by this project in the informal voluntary carbon market enabled the construction of 10 additional solar cookers.

The second survey conducted in April 2007 included reliable data from the first 44 families and a second group of 49 families who received their ovens between August 2006 and April 2007. The assessment concluded that there was an annual median emissions saving of 4 MT per oven. However, if each oven lasts for at least two years, the amount would be 8 MT per oven.

More recently, as the use of the solar cooker has been widely replicated, it has been demonstrated that on average, the



Mekhe solar cooker has demonstrated to reduce the use of firewood by 62.2% and charcoal by 52.8%.

In addition, the community reforestation programme established a nursery with the support of the local technical forestry service. 3,132 forest trees and 719 fruit trees were planted.

## Socio-Economic Impact

Those who use solar cookers are families who do not have access to government subsidized butane gas, those who live in rural areas, or those who do not have enough money to purchase butane.

The use of solar cookers saved the women time from gathering firewood from the forest. It also decreased physical labour, reduced health risks caused by smoke exposure, and generated additional income through the sale of baked goods and other food products.

The solar cooker project created 10 jobs, built the capacity of 105 women and 22 men, and placed 30 facilitators; 700 people, including two government ministers, visited the site.

In addition, households experienced a sharp decrease in energy expenditures and saw savings from not having to purchase gas, wood and/or charcoal. Women were also able to generate additional income by selling food and some even started solar bakeries as a small enterprises.

## Policy Impact

The inventor of the solar cooker, M. Abdoulaye Toure, works at the Ministry of Biofuels, Renewable Energy and Scientific Research and saw SGP and the Ndiop Women's Association as an ideal partner in testing/demonstrating the new device. Following a project visit and a positive report by the Minister, the president decided to upscale the initiative at the national level.

The collaboration between SGP and the Senegalese government continued when the Minister asked SGP's advice on how to integrate and replicate solar cooking at the national level. After mobilizing resources for making the solar cooker project a platform for the research, production and use of solar energy, the Senegalese government created a Solar Cookers Office in Research and 10 test centers across the country. The Department of Renewable Energies sponsored two training workshops in Diourbel and Sedhiou to build and use solar cookers.

As a result, SGP was invited to share its experience within the development of the current Renewable Energy Policy.



## Gender Equality and Women's Empowerment

Women's empowerment and interventions included:

- Promotion of women-led entrepreneurship
- Promotion of solar cookers in households
- Promotion of solar energy as an alternative to firewood and
- reduction of tree cutting
- Preservation of the environment by planting trees
- Training in the use and maintenance of the solar cookers

## Sustainability

Capacity building proved to be an important component, ensuring sustainability of the project. 260 artisans were trained in the construction of the solar cookers while 300 women were trained in the use of this technology. In partnership with the Miami Country Day School, there was an exchange of knowledge to test the solar bakery.

To spread knowledge and ensure institutional memory, the following were developed:

- A manual on solar cookers, in partnership with the University of Aval
- A DVD movie (in French and English), Women and Climate Change: The Solar Oven, A Priority for Sustainable Management of Forest Resources in the Sahel
- An article, "Solar Cooking to Improve the Environment", in Women & Environments International Magazine, No. 74/75, Spring/Summer 2007, pp. 15-17

## Replication and Upscaling

The original Mekhe solar cooker demonstration project benefited 1 association and 150 households. The project was then replicated by SGP in other communities, benefiting 9 associations and 855 households.

A number of other organizations have further replicated or upscaled the project, benefiting another 34 associations and 10,316 households. These organizations included the GEF, Senegalese NGOs, and French, Japanese, Swiss and Spanish agencies. Thus, according to the Ministry of Biofuels, Renewable Energy and Scientific Research, 11,321 solar cookers have been sold, of which 2,217 were subsidized, including 1,005 from SGP.

## Lessons Learned

The biggest challenges that the women-led project faced from project inception were the introduction and acceptance of this technology among a marginalized and illiterate group of women. Thus, awareness raising and education were crucial components of this project. It was also necessary to demonstrate the benefits (e.g., fewer health risks, greater income, improved well-being of women) that the project would bring.

The Ndiop Women's Association also faced a range of financial and technical barriers. For one, a mid-term project evaluation revealed that the quality of the first ovens was sub-standard, as 14 out of 44 cookers malfunctioned due to wear and tear and construction weaknesses. The group successfully addressed these issues by retraining the carpenters, thus improving local construction.

To lower financial barriers to the purchase of the solar cooker, each unit was sold on an installment plan at a cost of US\$60 over 15 months.

As the total manufacturing cost at the time was US\$ 100, the project provided a US\$ 40 subsidy for each oven. In addition, costs were mitigated by training local carpenters in the oven production, which ensured community control over prices.



Overall, the project managed to overcome all these challenges and lead the demonstration project into replication and upscaling thanks to the strong support it enjoyed from various stakeholders.

For one, the Senegalese government strategically used the SGP project to test and refine a solar cooking technology it wanted to make available to rural and secondary city households at a larger scale.

In this regard, the liaison and collaboration between the inventor at the Ministry, SGP and various government agencies has been critical in this strategic approach. The project was further supported through SGP's communication strategy which raised visibility by through media coverage of project activities.



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# Community Action