

Biodigestors in Rural Communities, Costa Rica

Themes

- ★ Renewable Energy
- * Linkages with other environmental goals
- ❖ Technical capacity development
- * Gender equity and empowerment (MDG 3)
- * Health (MDGS 4-6)

PROJECT DATA

Project Name: Biodigestors in rural communities

Implementing Organizations: Fundación para el Desarrollo de las Comunidades del Sur (FUDECOSUR) and Fundación Union y Desarrollo de las Comunidades Campesinas (FUNDECOCA)

Project Location: Brunca region, southern Costa Rica; Huetar region, northern Costa Rica

SGP contribution: \$40,000 (\$25,000 FUDECOSUR, \$15,000 FUNDECOCA)

Start Date: September 1997 (FUDECOSUR); April 1999 (FUNDECOCA)

ENERGY OVERVIEW

Energy Resource: biogas

Technology: biodigestors

Application: cooking

Sector: domestic

Cost of each system: \$150

Households Served: approximately 340 as of October 2001 (FUDECOSUR 300; FUNDECOCA 40)

BACKGROUND

These two biogas-related projects are located in two different regions of Costa Rica: the Brunca region in the south (FUDECOSUR), and the Huetar region in the north (FUNDECOCA). In both regions, families already keep livestock, such as pigs, goats and cows. However, foul odors, flies, and water contamination resulting from animal waste are problems. In addition, most families cook primarily with wood, which causes air pollution. Some families also use gas or electricity when they can afford to and when it is available. Some families construct kitchens outside their houses in order to avoid the smoke, but this is costly.

PROJECT DESCRIPTION

Overview

Both projects sought to train local farmers to build and use biodigestors, fueled by livestock waste to produce biogas for cooking, thereby reducing the burning of wood for cooking, decreasing carbon dioxide and methane emissions, protecting water sources and local forests, and improving livelihoods.



Biodigester construction and related training (Costa Rica).

Implementation

Farmers receive loans in order to build biodigestors and participate in training sessions to learn how to construct, operate and maintain them. FUDECOSUR began its work first, and FUNDECOCA sought to implement a similar model of work in a different region, and received technical assistance from FUDECOSUR. In FUDECOSUR's project, loans were given to households that had livestock operations and were willing for their farm to be visited by those wishing to learn how biodigestors work. During the project period, 93 biodigestors were installed, and 150 people were trained, about a third of whom were women. Since the project ended, approximately 200 additional biodigestors have been built, including some in Nicaragua and Panama. FUNDECOCA's project was smaller – so far 40 biodigestors have been built – but focused more on training women.

Technology

The biodigestors are above ground and made of plastic. FUDECOSUR, while providing technical assistance for FUNDECOCA, made some technical improvements upon the biodigester model. For example, they added a fine wire screen over the valve from which gases exit to help reduce noxious fumes, a device to eliminate the coating of scum that prevents the biogas from exiting; and a sieve over the opening through which organic matter so that rocks do not get in and break the plastic.

Benefits and Impacts

A report on the environmental and livelihood benefits of these two projects was prepared for the SGP office in Costa Rica, which involved interviews with biogas users, both organizations, and local community leaders. The description of benefits below is based on this report, issued in October 2001. Most of these benefits were confirmed, at least qualitatively, by field visits.

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Environmental Benefits

Global: The use of animal waste to produce fuel means that greenhouse gases are reduced in two ways: 1) methane is no longer emitted from animal waste that lies unused; and 2) fuel-wood burning is reduced since almost all cooking is now done via biogas.

Local: The use of biogas reduces pressure on local forests, thereby helping to protect local biodiversity. Furthermore, the contamination of water sources by animal waste is reduced. In addition, agricultural waste, such as from yucca plants) that previously was dumped is now being fed to livestock.

Livelihood Benefits

Health: Interviews with local women indicate that the reduced smoke has improved their health. For example, women said their breathing problems had gone away, and the condition of women with lupus in the community has improved. In addition, foul odors and flies associated with livestock waste have decreased, since the waste is now quickly removed and placed in the biodigester.

Savings: Families have saved money as a result of the biodigestors, although there is no evidence of how much. Savings come from reduced need to buy gas, electricity or wood for cooking.

Capacity Development

In FUDECOSUR's project, 150 people have participated in training sessions. In addition to learning how to construct biodigestors, these training sessions have covered topics such as why environmental protection is important, livestock management techniques, economic management for sustainability, women's issues, and health. Furthermore, some of those who participated in trainings and built biodigestors have since become trainers themselves, and have even traveled to Nicaragua and Panama to help implement similar efforts there.

In FUNDECOCA's project, FUDECOSUR helped provide technical assistance, and helped to construct the first four biodigestors. Certain ways to improve the technology of the biodigester were also identified (see below under "Lessons Learned.") FUNDECOCA's project does not seem to have organized specific trainings, but instead incorporated training and education about biodigestors into workdays in the field, during which the construction and use of biodigestors was demonstrated, and their advantages were shared and discussed.

Beneficiaries

The primary beneficiaries are farming families in these two regions of Costa Rica. In FUDECOSUR's project, an estimated 3 out of 10 training participants were women. In FUNDECOCA's project, there was a greater emphasis on involving women. In addition, FUDECOSUR's efforts have been replicated in Nicaragua and Panama.

Partners

International NGOs: FUDECOSUR was founded in 1993, with the support of CARE International.

Domestic NGOs: FUNDECOCA has had support and technical assistance from FUDECOSUR.

Local communities: In each location, community members have played important roles, since farmers themselves must build the biodigestors. FUDECOSUR has issued loans to farmers in 31 communities to build biodigestors. FUNDECOCA was active in 14 communities, and local revolving loan funds have helped provide loans to 11 farmers in FUNDECOCA's project.

Government: FUDECOSUR involved government representatives in the training sessions. These individuals provided technical assistance, and support to the project. For example, one ministry helped FUDECOSUR gain entry to work with communities located within national parks.

LESSONS LEARNED

Environmental Management

This project links climate change mitigation and biodiversity protection through the promotion of biogas produced from animal waste. The protection of water sources was particularly important in this project; in fact, the project has resulted in the reduction of complaints by neighbors to the health department about water quality and foul odors. It would seem that the Health Department should have some interest in promoting a project like this.

Barrier Removal

Technical: This project has reduced technical barriers in the sense that community members – in FUDECOSUR's case, as many as 150 – have learned to build the biodigestors themselves, and have themselves spread this knowledge to other communities and even to other countries (Nicaragua and Panama).

Information/Awareness: As evidenced by interviews conducted with women and men who use biodigestors in these communities, community members are more aware of how environmental problems affect their livelihoods, and how using a biodigester can improve the environment. The report did not examine whether or not other environmental issues were given more attention as a result of the biodigestors, which would be the true test of whether environmental awareness in general was actually increased.

Scaling Up

Through the SGP grant, FUDECOSUR had originally planned to install 80 biodigestors, in addition to the 30 they had already installed when they applied for funds. At the end of the grant period, FUDECOSUR's work had resulted in the installation of 93 biodigestors. Later interviews at the field level revealed that in this region, there were now about 200 farmers using biodigestors. Another interview suggested that about 300 were in use, but this included communities in Panama and Nicaragua

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that had received training from Costa Rican FUDECOSUR beneficiaries. These figures illustrate that FUDECOSUR's work, particularly through capacity building, has resulted in the spread of biodigestors beyond those originally planned. FUNDECOCA's impact is also continuing beyond its grant period. At the end of its grant period in April 2000, 29 biodigestors had been installed, but as of October 2001 that number had grown to 40.

Project Database, <http://www.undp.org/sgp>
Jorge Arturo Sáenz, "Biodigestores: Aportes a las condiciones ambientales y calidad de vida de la población campesina," October 2001, available online at: <http://www.nu.or.cr/gef/> (July 10, 2003).
Eduardo Mata, National Coordinator; GEF Small Grants Programme Costa Rica. Email communication, October 2003.

SOURCES CONSULTED

Project Records COS/95/G52-14 and COS/95/G52-38, SGP
