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# Introducing Biodigester Systems in North East Brazil

In the semi-arid region of Brazil's Northeast, home to the largest poor, rural population of the country, this USAID project introduced a simple, innovative technology – biodigester systems – that utilize goat waste to produce organic fertilizer and biogas, a clean energy source for lighting and cooking. In addition, the systems result in healthier goatherds and increased income for the farmers through the removal and processing of the manure.

In 2003, the state of Bahia launched the Strong Goat (Cabra Forte) program to strengthen goat production—the main livelihood in the region—that at the time suffered up to 40% losses due to animal waste-borne disease and lack of animal forage during the extended drought season. In support of the Strong Goat program, USAID installed two biodigestion demonstration sites that proved the utility of the biodigestion technology in supplying biogas to meet farmers' demand for energy, biofertilizer to increase forage production, and treating goat manure to eliminate vectors of disease.

Following on the success of the demonstration project, USAID initiated a number of information dissemination and training activities over the course of a year, in close partnership with the Strong Goat program, the Bahia Agriculture Extension body (EBDA), the Irecê Agricultural School (ESAGRI) and the National Small Enterprise Agency (SEBRAE). USAID's two demonstration project sites in the region, one at the EBDA Experimental Station in Jaguarari, and the other at the ESAGRI school in Irecê, were overhauled to serve as centers of capacity building. In preparation for training courses, a comprehensive Biodigestion Manual was

developed and printed. The Manual covers the basics of the anaerobic digestion process, digester sizing, manure management for digester loading, potential production of biogas and biofertilizer, installation materials and steps, operation, maintenance, safety hazards and precautions, and troubleshooting. The Manual also includes information on soil management, the detrimental effect of chemical fertilizers on the environment, and the qualities of biofertilizer.

One hundred participants were trained in the two, 2-day, hands-on training courses that taught technicians, students and leaders of farming communities the principles, benefits and requirements of biodigestion technology, as well as system sizing, installation, maintenance and costs. The hands-on training of locals involved the installation of a biodigester unit complete with biogas piping and three separate areas of forage plants—one to receive biofertilizer application, a second to receive only water and a third control area. The participants were able to observe the direct benefits of the biofertilizer on plant growth. Three enterprising groups of students started commercial projects with organic greens, onions and pinha fruit utilizing the biofertilizer.

Thirty participants were selected to be "Multipliers" of this knowledge, returning to their communities with the goal of disseminating the information and skills they had acquired. Through this propagation effect, which will continue after the project's conclusion, an additional 756 farmers have received information about biodigestion technology. The Multipliers were extremely effective in their work, organizing site visits



with new groups of farmers, promoting the technology at community meetings, and visiting individual farms to assess the potential for installing a biodigester.

During the project, it soon became apparent that farmers were very interested in obtaining biodigestors. The Baseline Study carried out during the project, however, showed that farmers' income was not sufficient to purchase biodigestors out-of-pocket, indicating the need for accessible financing. While an individual biodigestion system costs approximately \$700, the income of a typical farming family involved in the project is \$175/month. The project supported a Financing Seminar and initiated the engagement of the Bank of the Northeast and the Bank of Brazil, development banks that offer highly subsidized financing for rural clients. Subsidized credit is offered on an ongoing basis by these and other banks through the federally funded National Family Farming Program (PRONAF), which specifically targets small-scale agriculture in the Northeast and North of Brazil. Following a series of informational meetings and visits by agents to the demonstration sites, both banks now support the use of biodigestors to increase productivity of small-scale farming in the region. Furthermore, the Bank of the Northeast has since been working with USAID and other stakeholders to streamline the financing process for this purpose.

As a result of the project, the farming cooperative of the municipality of Jussara, COOPENG, is currently preparing loan applications for approximately 50 of its members to submit to the Bank of the Northeast in order to obtain financing for biodigestors. These farmers became involved after a group of members visited the ESAGRI Biodigestion site, and came away determined to incorporate the technology in their own production, mainly goat and pig raising.



*Farmer Cooperative working with Bank of the Northeast to Finance Biodigestors*

The current phase of the project focuses on helping the growing number of farmers who are eager to invest in biodigestors for their own properties to access financing. Although information dissemination and training will continue, the overarching objective of the new phase is to bridge the gap between farmers, financiers and service/equipment suppliers, leading to widespread purchase and installation of biodigestion systems in the region. Financing for the purchase and installation of at least 30 biodigestors will be sought over the next year. The project will also develop a technical assistance network to take over USAID's start-up support role and help guarantee the sustainability and increased access of these systems in the field.

**USAID Contact:**

Sharon Hsu  
Office of Infrastructure & Engineering  
+1 202 712 0889  
shsu@usaid.gov