



Renewable Energy Futures for Rural Mexico

Why Renewable Energy?

- Provide electricity and clean drinking water to families in need.
- Reduce costs compared to conventional alternatives.
- Reduce environmental impact in ways appropriate for local cultures.

A collaborative project to benefit rural Mexican communities

Roughly a third of the world's population lack access to electricity and clean water, and are not likely to get these basic necessities through conventional technologies which are often inappropriate for their living situations.

This project, funded by private donations, is a collaborative effort with several rural Mexican communities and dedicated professionals at the Mexican Foundation for Rural Development, to provide renewable energy technologies to rural families in the north of Mexico who make less than \$5 per day. Your donations will be used to directly subsidize the purchase of solar electricity for homes,

solar water distillers for clean drinking water, and durable battery-less flashlights. These technologies can allow dramatic improvements in the lifestyle of rural Mexicans, while protecting the environment and respecting their traditions and cultures.

This photo essay describes my November 2002 trip to visit one community in the north of Mexico, and with your support and the help of the Foundation, we can help many similar communities. Thank you for your donations and enjoy the report of my trip!

~ Jason West



A rooftop solar panel captures renewable, clean energy.



My hosts, the Acosta-Jaramillo family (from left): Fabián (15), Adrián (14), Francisco (12), Maria de la Carmen, Rosita (17), Joel (10), Felipe, and Alejandra (13).

Lavaderos

Lavaderos lies in the north of the state of San Luis Potosí, two hours by car from the nearest city, Matehuala, which is 7 hours north of Mexico City by bus.

I met Adrián Cruz Cazares at the bus station in Matehuala, and he drove me to Lavaderos. Adrián is a veterinarian, working with the Mexican Foundation for Rural Development to take care of animals in rural communities. After passing through several small towns, we drove on dirt roads for a half an hour to arrive at the village. This distance from the main road, as well as the distance between homes in the community, makes it prohibitively expensive to bring electricity to Lavaderos.

Adrián arranged for me to stay with a leader of the community, Felipe Acosta and his family. Felipe is Commissioner of the Ejido Tanque de Dolores, which has about 300 residents, and includes Lavaderos. Felipe also leads a local movement to protect the desert environment in this region, identifying erosion as an important long-term issue.

Felipe's daughter Rosita works in a nearby town to teach kindergarten – the family is proud that she has such a job. The other children all attend school – there is a primary school in Lavaderos, where Joel goes to school, and the others live with relatives in a larger town (with electricity) during the week so that they can attend school.

Life and Livelihood in Lavaderos

Lavaderos has about 50 residents, most of whom are related to one another, and although each family has their own land, they work together in the fields every day. The people of Lavaderos are proud that they don't smoke or drink. Except in times of severe drought, the community raises enough food (mainly beans and corn) to support themselves. While I was there, we ate three meals a day of



Together with his father, Adrián has the main responsibility for taking care of the goats. When Adrián is not in school, he will get on his mule and take the goats to pasture.

“sopa” – cooked beans and noodles (purchased) with homemade corn tortillas. Goat cheese, chicken, eggs, or salsa could be added as a treat, especially on a special occasion, such as my visit!

Goats are the only real source of income in Lavaderos. Each family has about 100 goats, and they are milked every morning. This produces one cheese (8 inches in diameter) every day, for which they earn \$1 (it will be sold for \$2 or \$2.50 at market).

Adult goats are sold for meat for about \$30 each, and a family sells about two goats per month. Altogether, **each family earns less than \$5 per day in income.** Because of these economic difficulties, many leave Lavaderos to find work in the cities. The Foundation is currently working on a project to cut out the middle man in the sale of

goats, allowing farmers to earn more of their full market value.

Homes in this region typically have dirt floors and open fireplaces over which they cook. Only the wealthiest families, like Felipe's, have concrete floors and wood stoves. No family has running water.

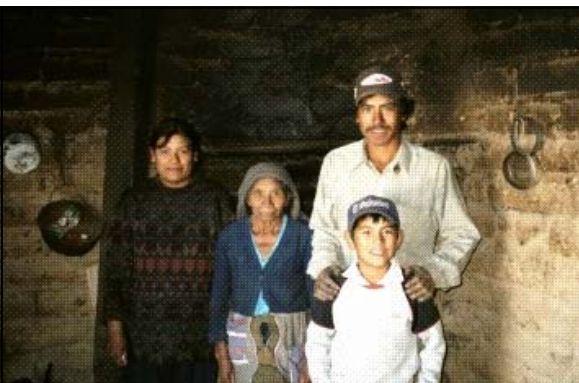
With Felipe's youngest son as my guide, I visited several homes in Lavaderos. Regina Banda invited us for lunch, and I was able to see her skill at cooking over an open wood fire – it did not look easy. The black walls in the kitchen showed the effect of years of smoke from the fire. Indoor air pollution from open fires is thought to be the most important cause of air pollution health effects globally. Solar water distillers can relieve water boiling, which is one of the major uses for indoor fires.

Three Renewable Technologies

Felipe arranged a meeting with the town to discuss what projects would be beneficial for the community. The meeting became a social event and the women of the community prepared a squash dessert for the occasion. Together we discussed three types of projects, and there was a clear consensus that these projects would be beneficial for the community.

~ Solar Electricity ~

Northern Mexico has among the best potential for solar power in the world. Currently, only two homes in Lavaderos have solar electricity, using roof-



Regina Banda (middle) with her son Juan (right), and daughter-in-law Emilia (left). They are in the kitchen in front of the open fireplace where they cook.

top solar panels. Felipe's house has fluorescent lights in every room, a black & white TV, and a radio. This radio provided the first source of news in the community, and they like playing Mexican music while working. At night, the battery stores enough power to provide light for a few hours, but the lights go out while they are still awake and they have to use candles. This light helps the family finish chores after dinner and allows the kids to study.

These solar systems were purchased with government subsidies, which are no longer available, highlighting the need for outside funding. Because they can see this working, the community wants it in their own homes.

With the Foundation's help, I have arranged for a local electrician to install solar systems for about \$650 per home. The system includes a 35 Watt solar panel, a battery, and three fluorescent lights. The solar panel is expected to provide electricity for 30 years (it has a 20 year warranty), with minimal costs to replace batteries and light bulbs.

\$650 will buy a family clean, environmentally friendly energy for the next 30 years.

Each family will contribute 20% of this cost.

~ Battery-less Flashlights ~

Flashlights are used sparingly in Lavaderos because batteries are expensive. An alternative is a durable, long-lasting flashlight that does not use batteries. This flashlight gets power just by shaking it – a magnet passes through a wire and generates power that is stored in a capacitor. The light emitting diode (LED) bulb is expected to last a long time, and they are sealed and waterproof. To thank the Acosta family, I offered them one flashlight, which they now use daily as much as needed. They can be bought in bulk for about \$20 each, and at this price, we can help many families in the region.

~ Solar Water Distillers ~

Water is the most precious resource in the desert. There are no wells in the community because they are too expensive, so rainwater is gathered in deposits of concrete or plastic lining and carried home by bucket. Water in the deposits is not safe to drink, and so water is boiled over wood fires. Gathering the wood is hard work and contributes to erosion, which Felipe stressed as an important problem.

A solar water distiller can provide safe drinking water, replacing the need to boil water. The distiller is basically a box in which water is evaporated by the sun's energy, and collected. It is very simple technology (not photovoltaic) with no parts to be fixed, and will last a long time. The distiller will provide roughly two gallons of pure water every day - enough drinking water for a family. Lavaderos does not have a distiller, but the Foundation has used them successfully elsewhere, and I am in contact with researchers at Sandia National Laboratories and New Mexico State Univ., who study the design and application of distillers in Mexico. Each distiller can be purchased for about \$350, and will provide enough drinking water for a family for many years.

Contaminated water causes health problems throughout the developing world.

\$350 buys a family quality drinking water for many years, while reducing labor, erosion, and indoor smoke.

Community Participation

With the Foundation's help, we will ask the local families for 20% of the cost of the solar homes, distillers, or flashlights - this will stretch resources to help more families, and will give the families a sense of ownership so that the technologies are well cared for.

Adrián Cruz Cazares will be our main contact for arranging to bring technologies to Lavaderos and other communities in this region, and reporting back to us about the project's success. Our other important contacts are in the Foundation's offices in Matehuala, San Luis Potosí, and Mexico City. And because there are many more communities in this region that have similar lifestyles and needs, there is almost no limit to the successful application of renewable energy technologies.



"The sun's energy is free, so we should use it" - Felipe Acosta

How to Contribute

Non tax-deductible contributions

All donations of cash or checks given to Jason West will be used for this project. Checks made out to Jason West can be sent to:

Jason West, 302 4th St SE, Washington, DC 20003

Tax-deductible contributions

Donations to the Foundation are tax-deductible in the United States, and the Foundation has agreed that all money raised through our efforts will be dedicated to renewable energy projects in communities like Lavaderos. Tax-deductible donations can be made by sending checks made out to the Mexican Foundation for Rural Development, to Jason West at the address above. Please also include the address at which you would like to receive your tax-deductible receipt. Tax-deductible donations can also be made by credit card by calling Jason West (evenings) at 202-543-5047.



Jason West, Ph.D., is an environmental engineer working towards solutions to climate change, air pollution, and sustainable development. He studied Mexico City air pollution for four years, and while living in Mexico, began this project with the Foundation. He is an American Association for the Advancement of Science Environmental Fellow, at the US Environmental Protection Agency. He enjoys traveling, hiking, gardening, piano, and of course, saving the planet. Please send your comments, questions, and dreams to solarmexico@yahoo.com.

The Mexican Foundation for Rural Development (FMDR)

FMDR is a nonprofit organization, created and sustained by private initiative. It has more than 40 years of experience improving the lives of rural low-income Mexicans. Through projects to support development, education, health, and energy, FMDR improved the well-being and livelihood of more than 22,000 families and over 1200 rural cooperatives in 2001.

More information is available at www.fmdr.org.mx.