

The modernization of small business through the EcoStove in Nicaragua.

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In urban and rural Nicaragua, most women spend a great deal of the day hovering over an open flame. While smoke billows from between the three stones of a traditional fire, women stir corn, cook beans and scald their hands on tortillas, meanwhile breathing in particulate matter and damaging their health. Their children congregate in the under-ventilated cooking areas, peering through the haze created by the smoke from the open flames and playing with the dusty, gray refuse that collects on the walls and ceilings of the home after years of constant smoke impact. After diarrhea, acute respiratory illness is the leading cause of death in young children in Nicaragua. The culprit of this health crisis is clearly an archaic stove design that begs for modernization and development.

Besides the difficulties associated with constant smoke inhalation however, a traditional Nicaraguan stove adds to the economic difficulties of a family due to the inefficiency of its energy consumption. To heat small amounts of food, women will often place tremendously large pieces of wood or the entire trunk of a small tree (Figure 1) into one

Modernisation de petites entreprises grâce à l'‘EcoStove’ au Nicaragua.

Le foyer traditionnel utilisé au Nicaragua est polluant et non efficace énergétiquement. Le nouveau foyer diminue les coûts en combustible, et réduit de moitié les émissions de fumée qui sont évacuées par une cheminée. Les femmes, qui auparavant se plaignaient de problèmes respiratoires, de maux de têtes et de pertes d'acuité visuelle, travaillent maintenant dans de meilleures conditions. Par ailleurs, l'EcoStove a permis aux femmes de générer un modeste revenu provenant de la préparation et la vente de repas.

side of the stone structure from where much of the wood-burning energy is dissipated, rather than being directed at cooking the food. The demand for cooking fuel has remained high in Nicaragua over the past years, as the unemployment rate has risen very rapidly, and many women are forced to support an entire extended family on the small income of a cooking enterprise.

To try to earn some income, women create small businesses by cooking tortillas, soups and quick meals. In Nicaragua, the typical meal of a *nacatamale* – a mixture of maize, vegetables and meat boiled for two hours inside a wrapping of plantain leaf – is often the main income-generating activity for a family. Selling food products from the backdoor of a home or from a street-side stand,

women add to their daily regime of cooking family meals and cleaning the home through this time-intensive activity, in the hopes that the small profits will sustain the family until a husband or older child might find work. Younger daughters, and occasionally sons, will contribute to the mother's enterprise by shaping tortillas or feeding the fire—further increasing their health problems and adding to the economic burden of buying constant fuel wood.

Within the urban centre of Managua and in smaller cities outside the capital, a new variety of stove is finding a place, among the traditional three-stone models. The EcoStove (Figure 2), an efficient enclosed stove, was first developed in Honduras under the auspices of Proleña, an NGO devoted to sustainable energy development in Latin America, with technical support from APROVECHO (see p.36) and financial support from TREES, WATER and PEOPLE, (both US based NGO's).

The EcoStove is an innovative woodstove which basically is a vented and insulated stove. The fire is entirely enclosed within the firebox (a ceramic elbow) which, in addition, is placed within a box of insulated material such as pumice rock. Above the fire there is a *plancha* (a large griddle metal) which is heated firstly by the flames and secondly by the hot gases (smoke) being circulated under the *plancha*, before



Figure 1: Cooking on a highly inefficient stone stove



Figures 2.1: The EcoStove

Case Study: Doña Luisa Hernandez

Besides caring for the home and child of a foreign couple during the week, Doña Luisa maintains a flourishing business in her home selling *nacatamales* during the weekend with the help of her daughter. 'The difference,' she says, 'is the huge savings in firewood.' With her old stove, Doña Luisa complained of 'gripe' (watery eyes, stuffy nose, problems breathing, headache and a chronic cough); never-ending cleaning due to the particulate matter buildup within the home; economic difficulties stemming from the cost of wood; and general quandaries with the function of an open flame. 'Every two to three days, we would have to spend 80 córdobas (US \$5.90) on firewood,' says Doña Luisa. The accumulated cost of wood proved to be a grim amount for the family since one entire *nacatamale* sells for only 8 córdobas (US \$0.59).



Figure 3: Making nacatamales

Doña Luisa works all weekend selling *nacatamales*, soups and a sometimes a traditional meat dish to people in her neighborhood [Figure 3]. Now, she says, 'We don't breath in smoke, the *plancha* is much better and hygienic and everything is always clean. It is just much more economically sensible.' Whereas she used to buy 12–15 cords of wood to make two hours worth of *nacatamales*, she now only buys five or six cords to make the same 80 *nacatamales* as before. 'I help the family very much,' she says. 'And even more than before. When I was using the old system, I was always sick and buying wood. Now, my cooking takes less time and costs less too.' Though her husband does construction work, his job tends to be temporary and Doña Luisa often supports the entire family with her personal enterprise. Though she rarely ever has time to rest, the 130 *nacatamales* that she sells over the weekend with the assistance of her EcoStove helps to send her children to university. 'My husband thinks the purchase of the stove was a good decision,' she says with a laugh. 'Now we have less problems.'

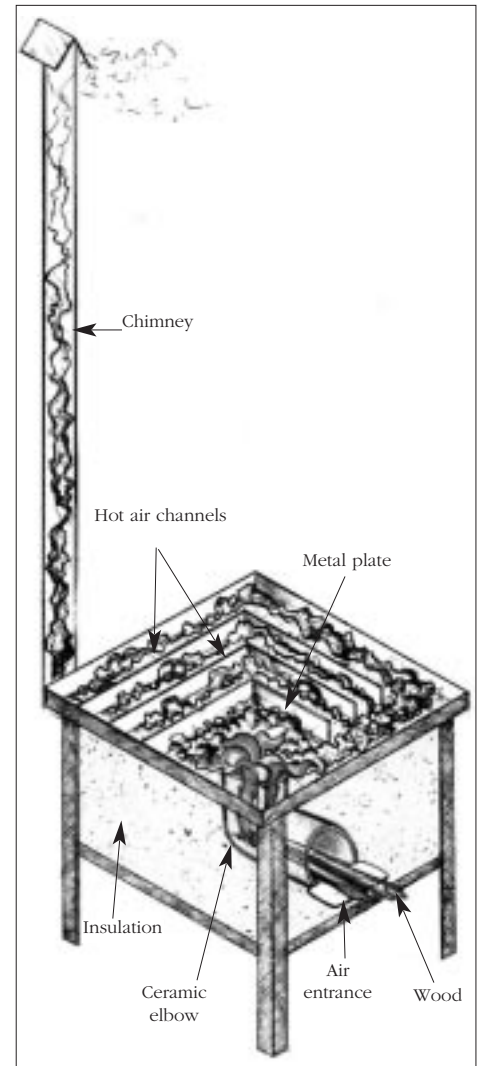


Figure 2.2: Schematic of an EcoStove

channeled out through a chimney (Figure 2.2).

Since there is only a small area to add wood and there is insulation, the consumption of firewood and smoke production is cut in half compared to an open fire. In addition, the firebox, the *plancha* (heat transfer surface) and the chimney are all connected by a sealed system, allowing no indoor air pollution.

Rather than coating pots with a layer of black soot from a traditional fire, women can place various cooking materials on the surface of the EcoStove without fear that smoke will contaminate the food. Moreover, they can cook tortillas directly upon the surface of the stove while the smoke is channeled through the chimney. This particular design alleviates many of the conditions of a three-stone fire that so directly damage the health and economy of a

Case study: Janet Socorro de García

Janet Socorro de García, a 36-year-old woman with three young children, supports her entire family with a street-side tortilla business. Working in a small zinc shack with a dirt floor, one table and two EcoStoves, Janet can make about 250 tortillas every day on each stove [Front cover]. She sells three tortillas for one córdoba (US\$ 0.07) and started her business four years ago when her husband lost his job. Currently, he is still unemployed though his wife admits that he occasionally finds temporary work. 'Before,' she says, 'we were using a normal fire. You know, of stones and metal.' Janet continues, 'I had horrible pains in my nose from breathing in the smoke and my hair would singe and curl up every day on my head. With the old stove, there was always smoke and it was much, much hotter next to the open fire.'

Every day, Janet works from five in the morning to six in the evening and then spends the rest of the night processing the corn for the next day's tortilla production. She says that her business is 'very, very important' and that it 'completely supports' the family. Janet only has to add a fraction of the wood to the stove—wood that she once had to buy in massive quantities. The concept of an economically advantageous stove is welcome because it augments the profit of the family business.

Janet's sister, Gladys, was highly skeptical of the US \$60 purchase of an EcoStove because it seemed an excessive and unsure investment. While Janet continued to cook tortillas, Gladys watched from her own next door enterprise with certain mistrust. However, after Janet bought a second EcoStove, Gladys decided to practice working with her sister's purchases and converted to the modernized cooking practices. Eventually, she bought her own pair of stoves and set up an identical tortilla business to aid her own struggling family. Janet's mother, who also lends a hand to her daughters' businesses says, 'Before, we just had a big fire and now there's no smoke. No one is sick anymore.'

Nicaraguan family. Women who once complained of constant breathing problems, headaches or diminishing eyesight while working over an open flame, now

work in the comfort of clear air and clean conditions.

Cleaner air, however, is not the only advantageous aspect of an EcoStove. Whereas families would once spend a significant

piece of their income on firewood every day, they currently save 50% of their fuel expense because of the energy efficiency. For Luisa Hernandez, a 45 years old native of Managua, the departure from a three-stone stove style to an EcoStove marked a dramatic shift in lifestyle.

For many women in Nicaragua, abject poverty has forced them to further fend for their families through small business practices. With or without an EcoStove, their lives are treacherously difficult and require unceasing effort. Through modernization of energy uses however, some families have relieved themselves of obtrusive health problems and increased the profitability of their industries. Savings in fuel wood expenditure, eradication of stifling smoke and increased ease of working conditions have facilitated the evolution towards modernity.

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Case study: Blanca Galeano

Across Managua in the neighborhood of Ciudad Jardin, a slight 53 years old woman named Blanca Galeano gestures towards a row of four EcoStoves (Figure 4). Everyday, Doña Blanca and her three daughters make 2,500 tortillas to sell in bulk throughout Managua. Originally, she cooked her tortillas on an open flame, using entire truckloads of wood every season. Rather than health issues, Dona Blanca complained about the immense amount of wood that was needed to create her home tortilla operation. Of her group of EcoStoves, Doña Blanca says, 'They are cleaner, cheaper and have less smoke. Also, I can cook my tortillas much more quickly.' With four lit stoves, Dona Blanca can place 70 tortillas on the combined plancha surface at the same time. 'It's magnificent,' she says.



Figure 4: Reducing wood consumption by using EcoStoves to make tortillas

Though she tried an LPG stove and admits that it was faster for cooking, she says that using gas is entirely out of the question due to cost. For her business, which supports twenty family members in one household, fuel wood is appropriate and cost-effective. Doña Blanca sells 600 of the 2 500 tortillas to the Zona Franca area of Managua and loads them in a truck every morning at dawn. She sells three tortillas for one córdoba, therefore earning 833 córdobas from a daily load of tortillas – a sure US\$ 62. One of her sons, a mechanic, helps bring in some family income, but otherwise all of her family is devoted to the small enterprise that centres on the daily use of EcoStoves. Savings in wood expenditures aside, Dona Blanca says, 'The thing that I like the best about the stove is the cleanliness.'