

Farm school: Sharing horticultural skills with the world

by [Fred Bahnson](#) in the [January 26, 2010](#) issue

On the flight into Fort Myers, Florida, I looked down on a vast, oil-driven network of fast-food chains, malls and suburbs, little fiefdoms of fancy destined for ruin in the low-carbon future.

Standing an hour later at the Global Farm sponsored by ECHO, the Educational Concerns for Hunger Organization, I felt that the contrast couldn't have been more stark. It was like stepping into the Nigerian village I grew up in as a missionary kid, albeit one with lots of white people. Instead of running on oil, this place derived its energy from contemporary sunlight; aside from a golf cart here and there, everyone walked or rode bikes.

At the moment I am sequestered under a clump of bamboo, hiding from the mid-afternoon Florida sun with a tour group of snowbirds—retirees from the northern climes who winter in southwest Florida. Of the 30 or so people on the tour I'm the only one under 60. Susan, herself a snowbird and one of ECHO's 450 volunteers, is our affable guide for the day. She is waxing eloquent about the wonder-working power of duck manure.

She points beyond the bamboo patch to a large pond where a strange wooden contraption juts over the water. It's a duck pen, Susan says, then explains the concept: the ducks, a mixed flock of Indian Runner, Cayuga and Khaki Campbell breeds, are let out during the day to eat weeds around the farm. At night they go back in their cage. The pond below their cage contains tilapia fish. In standard duck cages the duck manure would simply fall to the ground and become waste that the farmer would have to clean up, but here it falls through a wire screen and into the water. The duck poop feeds algae in the pond, Susan says, and the tilapia grow fat on the algae. The farmer gets to eat both the tilapia and the ducks, and the farm is weeded in the process.

Learning to see agriculture as an ecosystem with myriad moving parts fueled by sunlight, like this beautifully choreographed dance of ducks, tilapia and algae, is but one of many insights fostered by ECHO, a nondenominational Christian organization that for the past 28 years has been training missionaries and development workers in small-scale sustainable agriculture for the tropics. Their mission is “to equip people with resources and skills to reduce hunger and improve the lives of the poor.”

Never has such a mission been more needed. Early in 2009 the number of hungry people reached a historic peak: 1.02 billion. Experts like the U.S. Working Group on the Food Crisis say that hunger will continue to escalate; they cite rising oil prices, agricultural market and trade deregulation, the use of food crops to create biofuels, and drought induced by climate change. Most affected by these adverse changes will be farmers in the Global South, 60 percent of whom are women or girls.

Susan steers us through the Global Farm’s 12 acres, with six tropical ecosystems represented. In the Hot Humid Lowlands we visit a mushroom demo shed. Mushrooms add an essential amino acid for people on an all-rice diet, providing them with a complete protein.

The Tropical Monsoon area sports a nifty treadle pump, a simple foot-operated device used to irrigate a large garden. A hundred yards away in the Semiarid Tropics, the garden beds are sunken to maximize rainfall absorption. There we see a solar oven and a biogas digester, both low-tech, sustainable ways to capture energy on the farm.

ECHO has recognized the wealth of agricultural knowledge that already exists among the world’s poor farmers. The staff think of themselves as “extension agents to the world,” but rather than presume to “teach” people how to farm, they share information that helps people be more effective at growing food crops under the often harsh conditions of the tropics. “The vast majority of the world’s poor could never afford to have somebody do agricultural research on their behalf,” said Tim Motis, director of ECHO’s Department of Agricultural Resources and Seed Bank.

This research is vast and far-reaching. ECHO maintains an extensive Web site with thousands of free documents in French, Spanish and English, of which 900 are downloaded daily from around the world. An extensive tropical seed bank with over 350 varieties of food plants supplies agriculturalists working in impoverished

countries with free seeds. One of ECHO's main conduits for spreading knowledge is through this international community of development workers. Whatever tropical area in the world you might be headed to as an agricultural worker with, say, the Mennonite Central Committee or World Vision, you can find innovative crops and techniques at ECHO that will be appropriate to your region. Before leaving for Madagascar or Chad or Bangladesh you can peruse ECHO's bookstore and pick up a copy of *Erosion Control in the Tropics* or *Hand-dug Wells and Their Construction*—or perhaps even *Basic Camel Keeping for the Beginner*. One of the most popular is *From Amaranth to Zai Holes—Ideas for Growing Food Under Difficult Conditions*, written by ECHO's founder and former CEO Martin Price.

Price sees ECHO's work in terms of creating options. Rather than dole out prepackaged solutions, ECHO studies and disseminates a wide array of horticultural options for the very poor, for example, a solar oven or a high-protein fodder plant for goats, and then encourages farmers to decide which techniques they wish to adopt.

"For many peasant farmers around the world," Price told me, "it's not uncommon to be faced with the kind of scenario where your child needs an operation and you can either cut down the mango tree and sell its wood to pay for the operation or keep the mango tree—which you depend on for food—and watch your child suffer. That's no kind of choice to have to make."

By increasing options for the poor, Price believes, you've given them the tools to get themselves out of poverty. Instead of giving a man a tilapia and feeding him for a day, you hand him a schematic drawing of that nifty duck/tilapia/algae contraption and feed him for a lifetime.

Over in the Tropical Rainforest Clearing, Susan pulls back a thick mat of biomass covering the growing beds. "If people must cut down trees, we encourage them to stay on that same piece of land and improve it. Instead of *slash and burn* we want people to *slash and mulch*. Everything grown on this plot stays on this plot, which feeds the next crop and builds precious organic matter."

In contrast to the nutrient-draining soybean monocultures that dominate most rain forest clearings, this model rain forest is a riot of biological diversity. Unlike a monoculture, it doesn't depend on vast quantities of pesticides or fertilizers: raised garden beds form the understory, while palm, papaya and other fruit trees grow above, providing both horizontal and vertical growing planes to maximize yield. To

mimic rain forest conditions ECHO staff add an extra 100 inches of rain per year via an overhead sprinkler.

A large compost bin is stacked with banana leaves, palm fronds and other plant clippings in various stages of decay. The modus operandi of slash and mulch means that whatever comes out of the rain forest goes back into the rain forest. The great British soil scientist Sir Albert Howard called this process “returning to the soil her manurial rights,” an idea that has become one of the cornerstones of sustainable agriculture’s approach to fertility. It’s this emphasis on returning all nutrients to the soil, and of modeling one’s farm on the local ecosystem, that distinguishes ECHO’s work from more industrialized approaches to ending hunger, like the Green Revolution and its dependence on costly, toxic and quickly disappearing fossil fuels.

Our little group of snowbirds plus one 30-something journalist ambles over to an open-walled structure where we discover all kinds of gadgets on display. This is the Appropriate Technologies building. It’s like a toy store full of MacGyver-like contraptions, except these doodads actually improve one’s quality of life. There are water filters made from sand, smokeless wood-burning cook stoves, composting toilets, food storage bins, grain grinders and threshers, oil presses, and even a device called a PET—Personal Energy Transformation—a wooden wheelchair for people maimed by land mines.

Cook stoves are a big problem in developing countries. Kids are constantly getting burned from bumping into them. Since most people in the Global South cook indoors, lung disease from smoke inhalation is also a problem. On the tables are a number of simple remedies. Pot skirts protect small hands and force heat to travel around the outside of the pot, thus cutting wood consumption in half. A simple brick stove produces 70–80 percent less smoke and uses less wood.

I pick up a small object shaped like a hockey puck: a fire-starter briquette. It’s made from wet newspaper pressed together, then dried. There’s an ingenious device called a “bicycle blower”—an old ten-speed with its chain connected to a metal funnel and blower. Rice hulls are fed into the funnel. When the unit is pedaled, the rice hulls are blown out and used in a rice-hull stove to parboil freshly cleaned rice.

All of these devices here in the Appropriate Technologies building can be built with materials available in almost any village in the world. On the way out I notice a beautifully woven trivet. It is made from a material I never imagined would have an

afterlife anywhere other than in a landfill: a plastic grocery bag.

“People have resources they aren’t even aware of,” Tim Motis told me in his office. “There are plants folks don’t know the uses of—like moringa or chaya [perennial tree crops high in nutrients]—and ECHO can help people find those things.”

Motis recalls a visit to Haiti that had a particularly profound impact on him and that motivates his work at ECHO. He heard people singing in their churches about heaven. “Many had so little food, such poor shelter and clothing, that they had pretty much lost hope for life on this earth. I believe that Christ’s redemption doesn’t just start after we die. We can begin to experience life in all its abundance right here on earth. I realized I wanted to help people experience a better life now.”