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BUSINESS JOURNAL PHOTO/MICHAEL BUCK

Grand Valley State University Prof. John Farris with a prototype for a home-use machine that would roast, grind and brew coffee from plantations in Nicaragua.



## Field To Cup

Elizabeth Slowik

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ALLENDALE — Marketing strategy and engineering design are coming together at Grand Valley State University in a project to aid coffee growers in Nicaragua.

For several years, engineering Prof. John Farris and his students have been working on prototypes for a home-use machine that would roast, grind and brew coffee from plantations in Nicaragua. Marketing Prof. Paul Lane and his students have been looking at marketing research and strategies for the machine.

“Our goal is to help the people. Our goal is not to create an operation for ourselves,” Lane said.

“The vision here is that, if we can get the machines working right, you will be able to go online, order coffee from a particular cooperative or farm or group of

farms, read about their story, and you may or may not chose, after you've read their story, to help them with a special project.”

Coffee, a major commodity in the world markets, has been grown in Nicaragua since the 18th century. Twenty years ago, the Central American country's coffee industry was devastated by the Contra War, when the Sandinistas nationalized many farms and replaced coffee with other crops. As coffee growers recovered, they formed cooperatives to market their beans more effectively.



BUSINESS JOURNAL FILE PHOTO

Lane

Coffee production in Nicaragua was down in 2006-07 to 932,396 60-kilogram bags from 1.59 million bags the previous year. However, as of April, exports were up 35 percent for the first six months of the 2007-08 harvest cycle, Dow Jones Newswires reported.

Profit is still hard to come by and many coffee plantations are barely surviving on as little as \$400 per year, Lane said.

Many of the growers are women from a generation whose male population was decimated by war, he said.

Farris and Lane became involved with the coffee growers through a GVSU international education initiative that includes Smith College, a women's liberal arts college in Massachusetts that is known as one of the seven sisters, plus the Facultad Regional Multidisciplinaria and Universidad Popular de Nicaragua in Esteli, Nicaragua.

The interdisciplinary program encompasses hospital and ecotourism initiatives, as well as Farris and Lane's coffee project.

One of the tasks for participants is to brainstorm affordable products that solve problems specific to the area.

“The initial idea for the product came about when we realized that if we were going to help people in this particular cooperative, in a place called Mirafior, with coffee prices, we would have to do something to insulate them from world prices of coffee. It's a large commodity market, so one coffee bean is like another coffee bean, theoretically,” Lane said. He and Farris visit the region each December and May, accompanied by students, faculty and community members.

“One way we came up with doing this was, suppose we could use coffee in a different format than it's typically sold in the United States, which would be the

unroasted bean.”

Through market research, Lane and his students discovered strong interest in the U.S. for a home machine that would roast, grind and brew starting with the green coffee beans from Nicaragua. Lane estimated the market in Michigan alone could be 30,000 coffee drinkers over five years.

“The best target seems to be professional women with incomes above \$75,000 who are socially active in their community, as demonstrated by being involved in something. They might work with United Way, Girls Scouts,” Lane said.

“People always seem to score high, if they are coffee drinkers, on the idea of being able to actually buy coffee from a particular women’s cooperative or farm. They’re very interested in making this connection. It’s that people-to-people connection between the farmer and the consumer that really seems to make the difference.”

Added Farris: “It’s that people-to-people connection between the farmer and the consumer (that) seems to make the difference.”

Farris took the charge to design a roast-grind-brew machine to his engineering students. The task brings several challenges, and a final design still eludes them, he said.

“He wanted a countertop machine that, with as little user intervention as possible, could go from a green bean to his coffee. We have been working on that and there are a lot of challenges to that.

“Roasting coffee takes high heat. You’ve got to be careful when you’re dealing with high heat because you now have a fire hazard and a burn hazard. You also have to produce a very consistent roast, which is actually pretty challenging.

“Of course, you have the grinding, which is a little more straightforward, but there are still two or three different ways you can grind. And then the brewing is really the easiest part of the whole thing. You want it to be as simple to operate as possible.”

Function is one thing, but form is another. Market research told the professors they need a machine small enough to fit on the counter, under the upper cupboards of a kitchen. Some coffee aficionados may want to interrupt the process — for example, pausing between roasting and grinding for as long as four days. The machine also needs to be reasonably attractive.

“The first attempt at it was huge,” Farris said. “Its footprint was probably two laptop computers put together and it was probably 18 inches tall. Our last iteration is much smaller, higher quality. But we are still dealing with some questions of heat.”

Farris said the early design drew some interest at the Home Appliance Show in Chicago, and GVSU engineering students won a mechanism design contest

sponsored by the American Society of Mechanical Engineers.

A graduate student was inspired enough by the project to create a Web site, [www.beanbybean.org](http://www.beanbybean.org), that markets beans from individual farms.

“We’re at a very exciting point where we continue to challenge young minds. You can imagine the learning that goes on and on,” Lane said.

“It’s exciting to work with students on a real project that could potentially help hundreds of people to change their scale of living,” Farris added.

Farris said engineering challenges remain for future students. For example, the materials used — so far mostly plastics and stainless steel — must be food grade to meet Food and Drug Administration requirements and must be UL certified.

And then there’s the odor. The java aroma that has enticed people for centuries comes from grinding already-roasted beans.

“When you roast your beans, it has a rather distinct odor that most people don’t find appealing,” Farris said. Commercial roasting operations use after-burners to destroy the smell, but the open flame required would be unacceptable in a home appliance.

Plus, the final design must be able to be manufactured and distributed in relatively small quantities, most likely through Web sites and specialty stores.

“We’ve been talking with and have visited manufacturers. They want to make a profit; they want us to come in with a machine that’s ready to go,” Lane said.

“We had hoped they might be willing to help us solve some problems. So far, we haven’t found that person.”

Lane said they are aiming for a \$300 to \$400 price point, which would include a year’s worth of coffee, or 12 pounds, which could be ordered online. The hope is that consumers would establish a habit of continuing to order — and pay — on the Web.

This summer, Farris and Lane have been teaching a course on socially conscious innovation at the Meijer Campus in Holland. **BJX**

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