

OU engineering faculty and students are putting their expertise to work solving drinking water problems in impoverished regions — and they are doing it one village at a time.

BY DEBRA LEVY MARTINELLI



Residents of Pradera del Quetzal, Guatemala, and students from OU's chapter of Engineers Without Borders gather around a completed spring-fed, freshwater pipeline system designed by the students and installed with "sweat equity" from the villagers.

Clean Water



Water, water, every where
 And all the boards did shrink.
 Water, water every where
 Nor any drop to drink

*Samuel Taylor Coleridge
 "The Rime of the Ancient Mariner," 1798*

Coleridge's epic poem about a ship tossed by a vicious storm vividly describes the contradiction of water being plentiful yet unattainable.

More than 200 years later, the stanza still rings true, certainly on the sea, in a storm. But it also describes an equally dire situation, this one on terra firma.

The World Health Organization estimates that 1.1 billion people do not have access to safe drinking water, and 2.6 billion have inadequate sanitation. Mostly, they reside in remote villages in underdeveloped areas of Africa, Asia and South America. But even in the United States, many of our citizens, including some Native American communities in Oklahoma, have unsafe water supplies. The United Nations has designated as one of its Millennium Development Goals cutting in half by the year 2015 the number of people without clean drinking water.

The University of Oklahoma's WaTER Center is dedicated to help meet that objective, one village at a time.

The three-year-old center—the acronym stands for Water Technologies for Emerging Regions—is affiliated with OU's School of Civil Engineering and Environmental Science. Its goal is to help solve drinking water challenges for impoverished

regions through innovative teaching and research initiatives. Its director, David Sabatini, is passionate about the cause.

"Nothing is more basic than clean water, but we take it for granted," says Sabatini, a David Ross Boyd Professor, who also holds the Sun Oil Co. Chair in the College of Engineering. "In my career, I have focused on trying to clean up underground contamination, a major problem in the developed world. It's important work, but it's long-term, so I don't always get to see the benefits of my efforts.

"I've always been interested in traveling and learning about other countries and cultures, so a number of years ago I began thinking about how the rest of the world lives and what their important environmental issues are. I had reached a point in my life and career where I'd gone down the

traditional university path, and it was time to start thinking about what I could do to help those less fortunate."

At first, Sabatini was unsure whether this new endeavor would take the form of an avocation: maybe take some trips, he thought, but be separate from his professional activities. When he became immersed in the subject, however, he realized there is a role for universities to play and, with fellow engineering faculty, created the WaTER Center.

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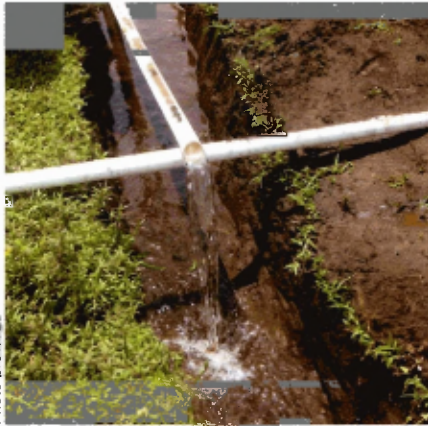


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for a World at Risk

The center has four integrated components:

- classroom education, which includes a WaTER course for upper-level undergraduate and graduate students, and Sooner Village, a multi-year, cumulative design project that begins in a student's first engineering course and adds increasingly challenging components every year, building on the nationally acclaimed Sooner City project created by civil engineering professor Randall Kolar;
- related extracurricular activities, notably sponsoring the OU student chapter of Engineers Without Borders (EWB);
- laboratory research on sustainable water and sanitation technologies;
- and national and international impact through EWB projects and the OU International Water Prize and Symposium.

Sabatini and the other leaders of the WaTER Center—Robert Knox, Ted A. Kritikos Professor and CEES director, who also serves as faculty adviser to the OU EWB chapter, and Kolar, an expert in surface and groundwater supply—take students to underdeveloped areas of the world, where they assess safe water availability and build the necessary infrastructure to get it to the people.

The first project was a direct result of Sabatini's introduction to Malcolm Morris, chairman of Houston-based Stewart Title Company, who was a co-founder of Living Water International, a non-profit organization dedicated to providing water for hospitals, schools, churches, orphanages and villages in developing countries. Living Water focuses its efforts on relatively simple projects that can be completed in a week by small groups of community volunteers.

When the OU EWB chapter was looking for its inaugural venture, it consulted Morris. "Malcolm was impressed

that the students weren't interested in doing a simple project," Sabatini recalls. "Living Water had completed projects in Guatemala, where there was fairly basic geology, and they could drill simple wells and install hand pumps to provide safe water.

"Then a Guatemalan mountain village, La Pradera del Quetzal, approached Living Water and asked for help. The project was too complex for Living Water, but Malcolm suggested we might take it on and helped put us in contact with the village."

"Dr. Sabatini brought student leaders of OU EWB to Living Water and interviewed three top vice presidents to hear about difficult projects. The students selected one, designed a solution and successfully carried it out, training the very people they were helping," Morris relates. "It is amazing to see the desire of students to help others. There is no question that a bond of love has been imprinted on the hearts of these OU students for life.

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Robert Taylor

Civil engineering professors Randall Kolar, left, and David Sabatini inspect a Potters for Peace ceramic water filter for household water treatment in remote villages.



Robert Taylor

Graduate student Laura Brunson conducts research on the use of bone char to remove excess fluoride from drinking water.

"I am so proud to play a small role in encouraging them and Dr. Sabatini in founding the OU WaTER Center," Morris adds. "Other universities would do well to emulate what OU has birthed! There are villages like La Pradera del Quetzal all over the world in dire need of safe water."

Sabatini led the first group of three students and Steve Vance, an OU civil engineering alumnus, on a five-day trip to La Pradera del Quetzal in January 2007. The objective was to ascertain needs, identify water sources—which turned out to be natural springs flowing out of the side of the mountain—and survey the area so students could go back home and design, and then return and install their solution.

"The village economy is based on farming. The residents harvest rubber from rubber trees and raise cows, chickens and goats. A river runs through the village, and as is true in many of these areas of the world, animal and human feces are used to fertilize the fields. When rainwa-

ter from the fields runs off into the river, that water is unsafe to drink. Spring water is much safer," Sabatini explains.

In addition to safe water, the villagers named their other top two needs: a schoolhouse and electricity.

But first things first.

When the students returned to campus, they designed a hydraulics system to transport spring water down to the village. Knox went back to La Pradera del Quetzal the following August with eight students and Vance to implement the design. The students helped lay things out, but the villagers provided all the labor. "It was something they wanted, and they came out en masse," Knox reports.

Vance shares the villagers' enthusiasm.

"The EWB experience is great for me. As with any venture in which you are giving of yourself, the personal rewards exceed what you are giving. The students offer so much in the way of enthusiasm, optimism and knowledge. The local indigenous population gives back joy, hope and

optimism for their future," he explains.

Once the water project was completed, OU engineering professor Gerald Miller, an expert in geotechnical foundations, led a third expedition in February 2008 to construct the foundation for a 3,000-square-foot school and community center.

With that, the WaTER Center helped address two of the village's top three needs, and OU students got to see a project from conception to data collection to implementation. "In engineering, you may get to be involved in one part—analysis, design or implementation. Even practicing engineers involved in professional EWB chapters say that one of the exciting things about it is that they get to see the whole project," Sabatini notes.

Of equal value for the teams is the experience that comes with even short-term immersion in another culture. "These people live in the humblest of conditions. They subsist on a dollar a day," Sabatini says. "It's quite an experience for anyone, especially the students, to see how others

that a bond of love has been imprinted on the hearts of these OU students for life."



Photo provided

live. At the very least, the increased awareness makes them better global citizens."

Mike Rice, a civil engineering junior, has traveled to Guatemala three times. "Each trip has been a truly life-changing experience. Not only have I gained valuable field engineering experience, but I also have gained a better perspective on the rest of the world," he says. "Actually seeing extreme poverty is very different from just hearing about it. Because of my experiences with EWB, I'm considering working with the Peace Corps or other service organization after I graduate."

Ironically, one of the benefits of these improvement projects is that sometimes they stop working or break down. "Part of our approach is to encourage local ownership to increase sustainability and spreadability," Sabatini explains. "If the villagers

Villagers from Pradera del Quetzal dig a 700-foot trench in preparation for a water pipeline that will bring fresh drinking water to the community. Residents had been in danger from drinking contaminated river water.

RIGHT: Children in La Pradera del Quetzal have a lot to smile about after intervention from the OU WaTER Center. The center helped meet two of the village's top needs— clean drinking water and a new school and community center.

BELOW: OU students designed the new hydraulics system for the village, but it was up to residents to implement it. Here, an OU engineering student goes over the plan with his willing work force.



Photo provided



Photo provided

see our work as an opportunity to develop a business that can help their community and other communities, then the good work spreads faster than we could spread it one trip at a time.”

So far, the criteria for selecting communities to help are based on need, proximity and the logistics necessary to transport the five- to 10-member teams to a remote site. Central and South America have been a natural fit, but WaTER Center folks traveled this past summer to Asia (Cambodia) and Africa (Tanzania) to explore opportu-

nities there as well. “We’re trying to have a global impact,” Sabatini says.

And they are. Sabatini works tirelessly to network with others doing this type of philanthropic work. “I recently received an e-mail from an organization in Washington, D.C., asking if we could help with a project in Bolivia. Turns out, we already are. [A trip to Bolivia is in the planning stages.] So now we’re becoming a resource that people contact when they have a need.”

The center’s global reputation is expected to be greatly enhanced with the establishment of the International OU Water Prize.

Modeled after the OU-based biennial Neustadt International Prize for Literature—known in literary circles as the American Nobel—the Water Prize will recognize someone who has made a significant contribution to water/sanitation in remote villages in developing countries. One year, a seven-member jury will select the winner and participate in a symposium; the next, the honoree will give a plenary lecture at a WaTER Center conference. The first jury will convene this October; the first lecture/conference is scheduled for November 2009.

The ultimate goal is an endowment capable of supporting a \$50,000 prize, with half going to the winner and the other half to a charity of his or her choice. The endowment also would sponsor WaTER Center student scholars and support a visiting faculty scholar for a semester.

Sabatini is gratified by the enthusiasm with which students have embraced the opportunities. “It’s exciting to see how all of this grows out of engineering but goes well beyond it. In some respects, the technical part is the easiest; the social, cultural, political and economic aspects are more challenging.

“Our students tend to grow up in an isolated academic technical zone. These programs give them an opportunity to experience all the other facets while they’re still students. They’re not just about ‘What’s in it for me?’ They really have a desire to help those less fortunate.”

That is what Sabatini always envisioned. “Other universities do some of the things we do, while other things we do are unique,” he muses. “We’re finding our niche. We want to play our part.”

More information about the OU WaTER Center or the International OU Water Prize is available by contacting Sabatini at sabatini@ou.edu.

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