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Engineers Without Borders Go to the Aid Of Rubber Tappers in the Brazilian Amazon

AMHERST, Mass. – A team from the UMass Amherst chapter of Engineers Without Borders (EWB) has just returned from an assessment trip to the Brazilian Amazon that will lead to a cheap, sustainable way to collect clean water and dispose of wastewater for some 1,400 people living in a rural preserve for rubber tappers. The refuge, a 2-million-acre site called the Extractivist Reserve Chico Mendes, is named after a renowned tapper organizer and was established almost 20 years ago by the Brazilian government in its state of Acre.

“Where we fit in is as a resource for the people living sustainably off the land,” says Marc Santos, an undergraduate from Ludlow in mechanical engineering and one of four members on the EWB Amazon Team. “Our purpose is to make their lives easier so they can stay there in a viable way. Our goal is to give them safe water sources, healthy sanitation facilities, and possibly electricity so they can survive and thrive in their forest environment.”

There is plenty of water on the reserve, especially during the nine-month rainy season, but it is often contaminated by parasites and other biological pollutants. Most of the 280 tapper families on the reserve get their water by filling water vessels from tributaries that run during the rainy season and carrying them back to their homes. A safer, though less-common, source is springs that bubble up at the base of hillsides, where residences have built wooden holding tanks called “spring boxes.” One problem with these spring boxes is that they aren’t fenced off, so surrounding animals and surface runoff can contaminate the water. The safest, but least common, method for gathering water is through springs located on hillsides, where residents build covered boxes. From there water feeds by gravity through hoses running downhill to the residents’ dwellings.

During its weeklong assessment trip to the Amazon, the EWB team met with representatives from various non-governmental agencies (NGOs) that work with the reserve, and recruited colleagues from a nearby university, the Universidad Federal do Acre in Rio Branco. EWB will use the NGOs and their university connections as a “reality check” to help determine if the engineering designs they develop will work in the singular environment and culture of the Extractivist Reserve Chico Mendes.

“We will discuss these water problems, and the culture surrounding them, with the whole UMass chapter of EWB in the coming months,” says Marina Pereira, a graduate student from Quincy in environmental engineering and a native of Brazil. “Then we’ll come up with what we think are sustainable solutions that can be carried out by the communities themselves.”

The plan is for the EWB chapter to bounce concepts and preliminary engineering designs in monthly reports off the Brazilian NGOs, its university contacts, and the local extractivist resident association. Then, with the assistance of feedback from the local community and organizations, the group will design and test the most promising solution, which will need to be sustainable,

culturally acceptable, inexpensive, and easily copied using indigenous building materials. The chapter will also create an educational booklet with detailed instructions for implementing the design. Next summer EWB will return to Brazil and build a prototype with the “hands on” participation of representatives of residents from throughout the Reserve. With the aid of the instructional booklet, the residents should then be able to carry out the design at their own homes and schools and thereby improve their water supply systems and sanitation throughout the Reserve.

The goal of this process is to work with the community to develop a design that the community itself has chosen and wants to implement. “Even when we give the workshop,” says Santos, “we’ll not only be educating them about basic water and sanitation engineering principles to improve their water quality, but we’ll also be learning from the residents how best to incorporate local materials, address local environmental conditions, and respond to local cultural concerns.”

The rubber-tapping region is rich in history. “Tappers first came to the Brazilian forests in large numbers at the turn of the 20th century, after a market for rubber was triggered by the tires needed for the new automobile industry,” says James Duda of Pelham. He’s a professional engineer and an attorney specializing in intellectual property and environmental law with Buckley, Richardson and Gelinis, LLP of Springfield, and a member of the EWB Western Massachusetts Professional Chapter. “The system of government tapper reserves came about following the assassination of Mendes in 1988 after he and others had organized tappers to fight the destruction of the forest because it was also destroying their livelihood.”

The motivations of Pereira and Duda for joining EWB illustrate the wide range of ideals that inspire the organization’s members.

“Since I was a little girl, after I moved here from Brazil when I was 12, my ambition has always been to go back and help the people in my native country,” says Pereira. “All my engineering studies were aimed at that goal.”

“One of the things I became frustrated with is that in this country tremendous resources are spent on relatively minor problems,” says Duda. “Then I would look around at other poorer countries and see how they had major, major environmental problems that could be addressed with relatively small amounts of money. So when I heard about EWB and this Amazon project, it was exactly the type of project I wanted to get involved with.”