Pungent odors and standing, contaminated water used to be the norm for the back yard of the orphanage for handicapped children in Maneadero, Mexico. The standing water, which pooled from the orphanage’s washing machines, attracted mosquitoes and other disease-carrying insects, creating an unhealthy environment. The poor conditions plagued the children and employees of the orphanage until the USU chapter of Engineers Without Borders showed up with willing hands, ready to dig in with engineering skills and service.

It was at this orphanage in Mexico that Ashleigh Restad found her passion for research and engineering. “This experience showed me how my engineering education translated into real life,” said Restad, a senior in the civil and environmental engineering program at USU. The Engineers Without Borders students installed two grey water management systems that collect wastewater from six washers and repaired a non-potable water storage tank when they visited this rural town in Mexico.

“It was amazing how basic, yet valuable, the work we performed in Mexico was to the people who live there,” said Restad. “I know that having a way to properly dispose the grey water will make a big difference in the lives of the children. They now have more room to play without having their health threatened.”

Restad recounted that the children were so interested in the work going on that she couldn’t help but let them join in. “I was testing soil when all of the kids gathered around and watched intently, so I made them my helpers.” The children’s curiosity helped Restad realize that engineering has a direct impact on people. “It really touched me to know that I was helping to improve the lives of these children with just a fairly simple sanitation improvement.” This experience created a desire to understand more about engineering, and it piqued her interest in research.

Restad investigates deep trench on-site wastewater disposal systems and evaluates the effectiveness of these systems in a project funded by the Utah Water Research Laboratory at USU. She believes that deep trench drain field systems may not have enough oxygen and microbes in the soil to degrade
contaminants in partially-treated wastewater from septic tanks. Restad has developed a method to sample water in soil below drain fields that can be used to determine if the contaminants have been properly degraded.

To test her hypothesis, Restad has collected soil water samples from eight homes in Cache Valley and is currently analyzing the samples to determine if the deep trench septic systems used at these homes are working properly so as not to contaminate ground water. If her hypothesis proves to be correct, she will be able to help influence changes in septic system regulations, which will in turn improve groundwater quality.

Restad’s research, which began in 2008, is on course to be completed sometime next year, but it hasn’t been an easy road to get here. As expected, there have been challenges during the research process, and Restad has found that things don’t always go as planned. “There is a big difference between theory and real life, and I don’t have all the answers to all the real-life problems,” said Restad. “I have had to learn to use my resources, such as faculty mentors and fellow students, and get my hands dirty trying to solve problems. The pieces are all starting to come together now, and it really pays off to know that I will be making an impact on someone’s life with my research.”

When Restad joined Engineers Without Borders in 2007, she could see the potential benefits that it would have for her future in research, but it would also fulfill her desire to learn more about the world through service. Restad knew that she wanted to use her engineering education to help others and was also interested in international travel. Restad became president of the club in 2008 and will continue in that position until her graduation in May 2010.

Engineers Without Borders is a non-profit humanitarian organization with the goal of seeking projects around the world where there is a need for an engineering skill, and it has been a perfect fit for Restad to fulfill her goals. The USU chapter strives to improve the quality of life for those in developing communities by creating and improving water supplies, housing construction, food production, energy, sanitation, transportation, communication, and employment.

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Ashleigh Restad, Undergraduate Researcher, Engineering
The end goal of every project is to create infrastructure that helps foster a sustainable, self-reliant society while fulfilling all the basic human needs of the people.

So far, the USU group has worked with several communities in underdeveloped countries, including the project in Maneadero, Mexico, which is now complete. The group is currently working on projects in La Salitrera, Mexico; Chijayna, Peru; and Masaka, Uganda. The Mexico team has since relocated their efforts to a village in La Salitrera, Mexico where they plan to improve the water distribution system, and create a filtration method to treat and disinfect drinking water, among other things. The Peru team worked to reclaim more than a mile of an irrigation canal that had fallen into disuse after disputes regarding water rights went unresolved. They installed water pumps for new drinking water wells as well as solar-powered heating systems for community showers. In Uganda, the teams have installed a drinking water well, improved various buildings and facilities, installed solar panels and built a dormitory. Each team plans to continue their efforts in the communities until residents can become self-reliant, and that means future trips and service projects.

Reflecting on her service and research, Restad found that there isn’t one right way to do things. “There are lots of problems in the world, and it’s our responsibility as emerging engineers to face them head-on.” In many cases, the solution to these problems calls for digging in and getting your hands dirty.

To learn about more international projects at Utah State, visit the Office of Global Engagement at blog.usu.edu/international.

A Notable Anniversary

Utah State is home to one of the earliest undergraduate research efforts in the nation, second only to MIT. In 1975, the USU Undergraduate Research Program began when President Glen L. Taggart implemented his vision for Undergraduate Research and Creative Opportunities grants. Today, 35 years later, URCO grants still give undergraduate students the opportunity to work alongside experienced faculty mentors and receive funding for their scholarly work. Since its inception, hundreds of students have enhanced their research experience through URCO. The 35th anniversary of the Undergraduate Research Program in 2010 celebrates the accomplishments achieved throughout the years.

Today, USU’s undergraduate research program provides students with numerous opportunities to share their work with the USU community and with other audiences across the nation. They participate in events such as Research on Capitol Hill and the Utah Conference on Undergraduate Research, where they share their ideas with government officials and other students from around the state. Many students even present their research at the National Conference on Undergraduate Research, held annually at various universities across the nation. Undergraduate researchers at USU have an impressive list of achievements that includes Goldwater and Rhodes scholarships, participation in the USU Research Fellows program, and the USU Undergraduate Researcher of the Year awards—the Peak Prize. Students can even receive a designation on their transcript setting them apart as researchers. In 35 years, the Undergraduate Research Program has grown significantly, and has provided USU students with a legacy of hands-on learning.