AguaClara

A project of Civil & Environmental Engineering at Cornell University

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Fundraising Call: AguaClara Water Treatment Plant in Agalteca

Join us in our endeavor in fundraising for a water treatment plant to benefit 2,160 people in Agalteca with 360 household connections. Agalteca is a rural community in the municipality of Cedros, approximately 1.5 hours from the capital of Honduras. While the community has access to an abundant water source from the Santa Clara River, the water is not safe to drink due to the high turbidity during the rainy season.

Initial investigations began in Agalteca in March of 2008. After monitoring the water quality and determining that AguaClara technology would be appropriate, presentations were made to the community water board and members of the municipality. In February of 2009 the Director of Agua para el Pueblo, the Mayor, and the water board President signed an agreement to formally begin the fundraising process for the plant.

The project includes the feasibility study, design, plant operator training course, community education, and construction. The total project budget is $66,330. Agalteca has committed $11,000 in labor and materials toward the construction project. We need to raise an additional $55,330 to bring safe water to Agalteca. Our goal is to raise these funds by September 1, 2009 and to hold the groundbreaking ceremony to celebrate the conclusion of the fundraising effort on that date.

Tax deductable contributions to the Agalteca project can be made by sending a check made out to Cornell University. Checks may be sent to: **AguaClara 220 Hollister Hall Cornell University Ithaca, NY 14853**. Online contributions can be made at https://confluence.cornell.edu/display/AGUACLARA/Donate.

Agua Para el Pueblo

Meet our partner organization Agua Para el Pueblo (APP) in Tegucigalpa, Honduras. This August APP (translated, 'Water for the People') will be celebrating 25 years of providing Honduran communities with water and sanitation projects. The director, Mr. Jacobo Nuñez, has been a friend of AguaClara Director Monroe Weber-Shirk since they met in 1982.

Jacobo Nuñez

APP has been involved with Cornell University since 2003 and became engaged with the AguaClara technology when they supervised the construction of the Ojojona plant in 2006. Since July 2007 Cornell Alumni working as AguaClara Engineers Abroad have been welcomed to the APP office to provide technical support in the design and operation of the AguaClara plants.

Inside this issue:

Inauguration at 'Las Cuatro Comunidades'

On June 6, 2009 the third AguaClara water treatment plant built under the supervision of APP was inaugurated in the Amarateca valley, 40 minutes north of Tegucigalpa. The plant serves the communities of Los Vallos, Rio Frio, Aldea Bonito and La Jagua, collectively known as 'Las Cuatro Comunidades' (The Four Communities).

The plant was designed to treat 100 gal/min (6.3 L/s) for a current population of 240 household connections or approximately 1,500 people. The communities previously were consuming raw, turbid water with chlorine. The relationship developed with Las Cuatro Comunidades because APP had already been working in the Amarateca valley for the last 6 years. APP worked on improving the distribution system and building a new distribution tank for the community, completed in May 2008. Additionally, since Las Cuatro Comunidades is only 15 minutes from the AguaClara plant in Tamara, it is a strategic location for the APP technician to more easily provide constant technical support to the waterboard and plant operator.

The project was made possible through support from Alianza por el Agua ('Alliance for Water'), CESAL an NGO from the Spanish Cooperation for Development, and friends of AguaClara.

Design Improvements

The third plant built under the supervision of APP demonstrates significant improvements in the AguaClara design. A new linear dose controller administers the aluminum sulfate in relation to the plant flow rate. The plant operator will always need to select the appropriate dose for the incoming turbidity, however, when the plant flow rate changes the amount of chemical being applied will change accordingly so that the dose remains constant.

Another major improvement is the depth of the sedimentation tanks, which were reduced from 2.0 m to 1.55 m deep. The sedimentation tanks now utilize distribution tunnels along each side of the tank to distribute the flow uniformly.

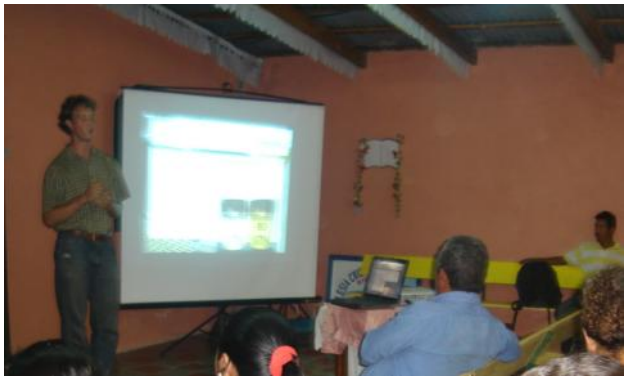
New chemical doser and linear flow orifice meter (LFOM) in the entrance tank

New sedimentation tank design

Validation Study on AguaClara Field Performance

As of April 2009 AguaClara re-welcomed Fulbright Scholar Daniel Smith (CEE 06') to the Honduran team. Daniel had initially worked on the AguaClara plant in Ojojona in the summer of 2006 through the Engineers for a Sustainable World (ESW) SEED Program.

Daniel is back to work on a validation study monitoring the performance of the AguaClara plants. He is working closely with SANAA and has received further funding from RAS-HON (Honduran network of water and sanitation) to carry out the study.



Daniel Smith Presenting

University of Polytechnic Engineering

June 8-13th 2009 Director of AguaClara, Monroe Weber-Shirk, taught a one week intensive course to 53 engineers, technicians, and business representatives of public-private water authorities. The course took place at the 'Club for Civil Engineers of Honduras' (CICH) and was organized by the University of Polytechnic Engineering (UPI), the National Service for Aqueducts and Sewers (SANAA) and the National Council on Water and Sanitation (CONASA). The focus was on the theory and design of AguaClara water treatment plants.

1 BILLION PEOPLE DO NOT HAVE ACCESS TO CLEAN WATER.

Rapid Mix, Flocculation, Sedimentation, and Disinfection were discussed. The newly available AguaClara Design Tool was also presented to facilitate the dissemination of the AguaClara technology. The presentations are available at: https://confluence.cornell.edu/display/aguaclaraes/Diplomado+Junio+2009.

UPI students visiting Cuatro Communidades plant

Online AguaClara Design Tool

To appropriately scale AguaClara for the growing need for the technology, a free design tool accessible online allows users from all over the world to input design constraints and receive a 3D CAD plant drawing and design guidelines via email. Dimensions for all plant hydraulic components such as the tanks, tubes and channels are provided. A civil engineer can then design the structure and select appropriate building materials.

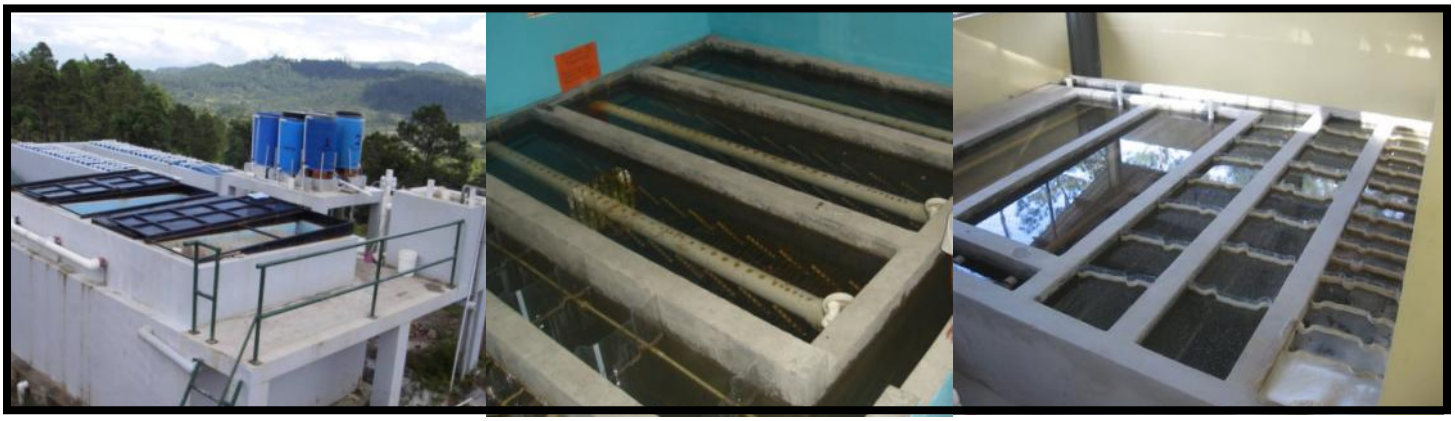
AGUACLARA PLANTS CURRENTLY SERVE OVER 15,000 PEOPLE.

The Honduran AguaClara Engineer, Wilfredo Serrano is writing a construction manual describing the building process and sharing experiences and tips.

AguaClara is a project in Civil and Environmental Engineering at Cornell University that is improving drinking water quality through innovative research, knowledge transfer, open source engineering and design of sustainable, replicable water treatment systems.

Please contribute directly at the AguaClara website:

https://confluence.cornell.edu/display/AGUACLARA/Donate



http://AguaClara.cee.cornell.edu

Research at Cornell

The AguaClara summer program at Cornell has 20 students that are separated into teams that specialize in different aspects of the AguaClara technology. The design team, by far the largest team this summer, has been developing an automated materials list that a user, using the design tool, would be sent along with rest of the design. In addition, they are developing designs for a horizontal-flow hydraulic flocculator, weirs that will control the plant water levels, and an improved vertical-flow hydraulic floc-culator.

Two of the research teams: Dissolved Air Flotation of Flocs (DAFF) and Chemical Dose Controller (CDC) are focusing on retrofitting current designs in an effort to eliminate the occurrence of floating flocs and minimize the formation of surface foam at the beginning of flocculation, respectively. The DAFF team has been researching gas removal from supersaturated water via a backwashed sand filter. In the past month, the team has made modifications to the previous experimental setup in order to more effectively simulate the conditions that cause floating flocs.

The CDC team has been modeling the surface foam formation that takes place at the end of rapid mix and subsequently evaluating the effectiveness of a variety of retrofit designs that aim to minimize air entrainment in the LFOM. Last but not least, the Plate Settler Spacing team has continued to investigate the tube settlers performance and are currently working to gain a better understanding of how influent turbidity and alum dosage affect the performance of the tube settlers at different floc blanket levels.

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