RainXchange™ System—Kuve Village Ghana, Africa

Installed by the Aquascape Foundation in January, 2009

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Aquascape's RainXchange™ System is designed to capture, filter and reuse our world's most precious resource…water. Intended as a storm water management solution, the flexibility of the system allows it to be utilized in a variety of unique applications including the provision of clean drinking water. The Aquascape Foundation's trip to the Kuve Village in Ghana, West Africa became an especially memorable opportunity to put this system to good use. The system is actually quite simple and is not new, since rainwater capture has been used by many cultures throughout the world for thousands of years. Aquascape has updated the system a bit for the 21st century.

The Kuve village has a brand new school with a new metal roof, which is perfect for capturing the abundant rain that falls in this beautiful coastal country. When we arrived, we found the roof was in perfect condition but it had no gutters so we needed to first create a gutter system using 6" PVC pipe that we mounted at the base of the roof to capture the water. The water then flows down a series of pipes that travel underground and make their way to the rainwater storage basin located about 30' from the end of the school.

Our team excavated an area of 22' x 24' and 4' deep with a layer of sand spread across the entire bottom; this provided the perfect base for the 8,000 gallon reservoir. A large sheet of EPDM liner was placed inside of the excavated basin, creating a waterproof barrier. We then placed two of our Snorkel Vault™ and Centipede™ Modules into the lowest portion of this excavation. These units house the pumps and control switches for the system. The rest of the basin was filled with 240 AquaBlox® Water Matrix units, which are designed to create a structural void space that allows them to be filled with water. Once they're wrapped in the EPDM liner they can be completely buried without crushing them under all of the stresses.

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The 22' x 24' basin has a depth of 4 feet. 240 AquaBlox® Water Matrix units will fill this hole.

Aquascape Foundation volunteers work with village residents to spread the liner over the basin.

Two feet of soil was mounded and compacted over the top of the entire system in order to shed water born contaminants away from the reservoir, allowing only water from the roof of the school to enter. The water enters into the first chamber of the reservoir from the pipes coming from the roof. The swift moving water is allowed to slow down upon entry and any suspended sediments will then fall to the bottom for removal.

Since there is no electricity in the village, we needed to install a solar panel on the roof of the school to power the pump. We incorporated a solar powered transfer pump to move water from the first chamber to the second chamber. During this process the water passes through Genieye Systems' Eye-Nizer™ ionization manifold where trace amounts of copper and silver ions are added to the water. This is a common water treatment practice that is proven to kill bacteria and other water born pathogens.

The now sterilized water is stored in the second chamber until it's needed. The water is accessed by a simple hand pump we installed, which can be used to fill the many containers in the school and village with cool, cleansed water. A float switch in the second chamber will signal the transfer pump to cleanse and deliver more water as it's needed.

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Underground pipe is installed to carry water from the downspout to the rainwater storage basin.

A solar panel was installed on the roof of the school in order to power the transfer pump.

240 AquaBlox® Water Matrix units are set into the basin creating an 8,000 gallon reservoir.

Two chambers are created. The first holds the initial roof run-off and the second holds the sterilized water.

The RainXchange™ System will capture and clean over 100,000 gallons of water per year allowing 400 children access to clean drinking water. In addition, the ready access to clean water makes it possible for the school to cook one hot meal per day for the kids.

We couldn't have made this trip without the help of some friends. Aquascape Foundation volunteers who participated in the rainwater harvesting project included; Lauri Mitchell of Mitchell Motivation in Palatine, IL; Roberto Cosme and Tim Bottoms of Aquascape, Inc; Tim Muttoo of Genieye Systems Inc. in Ontario, Canada; Dale Vnuk of Wyld Creek Water Gardens in Fox Lake, IL; Al Lentz, of Lentzscaping in Warminster, PA; Glenn and Isaac Ferrell of Living Water Aquascapes in Lakeland, FL; Bob Blasing of Ripple Effect Water Gardens in Redwood, CA; Keith Robinson, of Semco, Inc. in Belton, MO; April Dugan of Nature Scapes in Grafton, NH; and Karen and Dayton Wright from Ogden, UT; Foundation president Carla Wittstock, Wayne, IL; and Foundation vice-president, Ed Beaulieu of Aquascape, Inc.

Two feet of soil is mounded over the reservoir to block water born contaminants from entering the basin.

Residents carry water from the river to fill the basin. The system was installed just prior to the rainy season.

A hand pump is installed where residents will be able to pump clean water from the reservoir.

Aquascape Foundation volunteers pump the first glass of clean drinking water.