

Feasibility of Starting a Ceramic Water Filter Factory in Limpopo Province, South Africa

In late May 2010 I traveled to Limpopo Province in northeastern South Africa to pursue research into point-of-use, household water treatment technologies. I am specifically interested in ceramic water filters (CWFs), a low-cost, highly effective, sustainable water treatment technology that is in use in numerous communities around the world. My project is a continuation of a long-standing collaboration with students and faculty from the University of Venda (UNIVEN) in Thohoyandou, Limpopo Province. I worked in collaboration with three other UVa students. Together we received additional funding through the Jefferson Public Citizens program for our research into the feasibility of starting a CWF factory in or around the city of Thohoyandou. This factory would supply rural villagers and city residents, who do not have a constant water supply, with the means to safely filter and store their water.

We investigated the different components necessary for launching this type of business. We conducted an in-home survey of 220 homes in two villages that do not have piped, treated water from the municipality. The survey posed questions about current water beliefs, water use, water storage, and water treatment, as well as knowledge of water treatment technologies. It included questions about preferences for water treatment technology characteristics and prices. We will continue to enter data from this survey into our database and begin analyzing it this fall.

We also collected water from storage from each of the homes that was surveyed. In the Microbiology Laboratory at UNIVEN I tested the household water samples for the number of total coliform bacteria, the number of *E. coli*, and turbidity. Preliminary results show that some villagers have very clean water while others are drinking extremely contaminated water that poses a severe health risk. With my advisor, Civil Engineering professor Jim Smith, I visited several local, established potters to propose the idea of adding the production of CWFs to their existing business. I am very excited to pursue communications with a cooperative of women potters who took an interest in the CWFs. These women (about 50 total) work out of a government-built workshop and even have a kiln available to them, although they were never taught how to use it. I collected clay samples from the potters' clay sources to analyze in the UVa Civil Engineering laboratory. I will create ceramic disks from the clay samples, which I will use to test the clay's capability for use in CWF production.

We investigated the supply side demands of a filter factory and began work on a business plan. The materials required for CWF production are: clay (it can be fresh or you can grind down old, fired bricks), sawdust or other combustible, plastic buckets, spigots, and colloidal silver. There is sawdust available in large quantities from at least one hardware factory in Thohoyandou. There are a number of brick-making factories in the area, from which we could probably obtain unwanted, fired bricks for use as clay material. Buckets and spigots, however, were not to be found in the Thohoyandou region and would have to be sourced from somewhere farther away, as would the colloidal silver. If plastic buckets are untenable, it is possible for the potters to produce clay buckets instead. As part of our business plan, we will also investigate electricity costs for powering a kiln and other machinery.

As part of the demand side of our feasibility study, I interviewed the managers of several public clinics to explore the possibility of selling filters through the clinics and incorporating safe water practices education into their community outreach programs. I further discussed this idea with contacts I made in the Department of Health in the municipal government office. All parties showed interest in

the CWFs and a factory and are awaiting follow-up. We will investigate government subsidies and partnerships with NGOs in the area.

My experience in South Africa this summer taught me a lot about research practices, community development projects, business, and cross-cultural interactions. Our work was very slow to start, in part because of miscommunications with students and faculty at UNIVEN. We had to complete some very time-consuming and frustrating negotiations over the work schedule, transportation, payment, and food for our UNIVEN partners who conducted the in-home surveying. We slowly learned about the way things are done in South Africa, within the Venda culture, and at UNIVEN. One particular experience reassured me that the work we were doing was worthwhile and relevant: while surveying households one day, we spoke with a mother whose son died the week before due to diarrhea and dehydration (water-related illnesses). It was difficult for her to answer our questions about her water use because of her recent loss.

We still have much work ahead of us this semester. We will analyze our survey data and I will analyze my water sample data and begin working with my clay samples. If our data reflects a need and a desire for a CWF filter factory, we will have a lot to do to move forward with this project. It is my hope that I will return to South Africa next summer to continue this project.