

Tristan Downing Travel Grant Report

Organization: Cambridge Development Initiative

Role: Engineering Project Director

Location: Dar es Salaam, Tanzania

This summer I was running the Cambridge Development Initiative's (CDI) Engineering Project. The project consisted of three components, each of which I had to manage: simplified sewerage network construction, biogas device optimization, and fertilizer production. CDI also runs three other locally-driven projects in Dar – entrepreneurship, education, and health. CDI was founded in 2013 as a student-led development organization, committed to collaboration between UK and Tanzanian university students, and empowering local people to become the changemakers of their generation. All four projects had a very successful summer, and I am proud of the engineering project's achievements.

In the field of simplified sewerage expansion, we achieved a long term project aim of government adoption. The municipal sewerage provider had long been supportive of the project, but only this summer have they agreed to fund our simplified sewerage network, and more importantly agreed to take over the project themselves over the coming years. Simplified sewerage is like conventional sewerage, but is much cheaper, easier to install, and accessible to otherwise hard-to-reach dense settlements. Communities can install entire sewer networks with very little outside help – all the trenches can be dug easily by hand. Simplified sewerage is a fraction the cost of conventional sewerage, but does not sacrifice any functionality. This is possible by relaxing overly-stringent regulations. The settlements we work in are very densely populated, with little space between for houses for vehicle access. This means that it is difficult and costly for residents to empty their pit latrines, so often people resort to letting them overflow into the streets during the rainy season. In addition to connecting over 100 residents to simplified sewerage this summer, the project can connect another 1000 over the coming year.

CDI's biogas digester was installed last summer, but has not been producing biogas at an optimal rate. Biogas is a mix of methane and other gas produced as organic waste breaks down. It can be sold to the community, and replace the currently ubiquitous charcoal cookers which contribute heavily to deforestation nationally and produce harmful particulates locally. Optimizing gas production involved digging the whole digester up, opening up blockages, and sealing leaks. We also designed and built a new innovative inlet and outlet system for the sewage entering the digester that facilitates addition of other organic waste from the community, such as vegetable peelings.

The fertilizer production component of the project is new this year. By heating waste coming of the digester, it is treated for pathogens and de-watered, so can be more easily transported and sold as fertilizer. To do this, we built on a previous Solar Oven design to make the EvapoDryer – a parabolic dish that concentrates solar radiation on an oil drum that can be filled with waste. We built several prototypes in the summer, which are being tested year-round by community members.

Overall, returning to Dar this summer was very rewarding, due not only to the project's continued success, but also seeing the personal development of volunteers. CDI will be in good hands for next year, with handover currently in progress.