Project Sheluka Update, February 2022

Everytime I am frustrated or momentarily derailed in this effort I am reminded that there is a very good reason why people living at the edge of the world do not have clean, reliable water: Because it's hard.

I returned to Zambia in June 2021 attempting to find parts to make a PVC-based pump in Lusaka. Not only was I not able to find suitable materials, the pump I built in Kentucky worked but proved too physically demanding for communal use.

Working the PVC pump in Kalenge Village. While an adult could operate the PVC pump it was far too difficult for a child to use. 12 June 2021.

While in Kalenge Village we repaired the four original “store-bought” cast iron pumps installed in November 2019. Between parts I brought along and scavenging bits from broken units we had four operational pumps at the end of the day. I made notes regarding points of failures: clevis pins worn through, broken casting at base of pump body, etc. Knowing what breaks helps in choosing/designing a better pump.


The ingenuity of the citizens of Kalenge Village is worth noting. In their first experience with suction pumps resourceful folks fashioned clevis pins from wood and secured the pump top to the body with wire in lieu of the broken bolt casting.
12 June 2021.

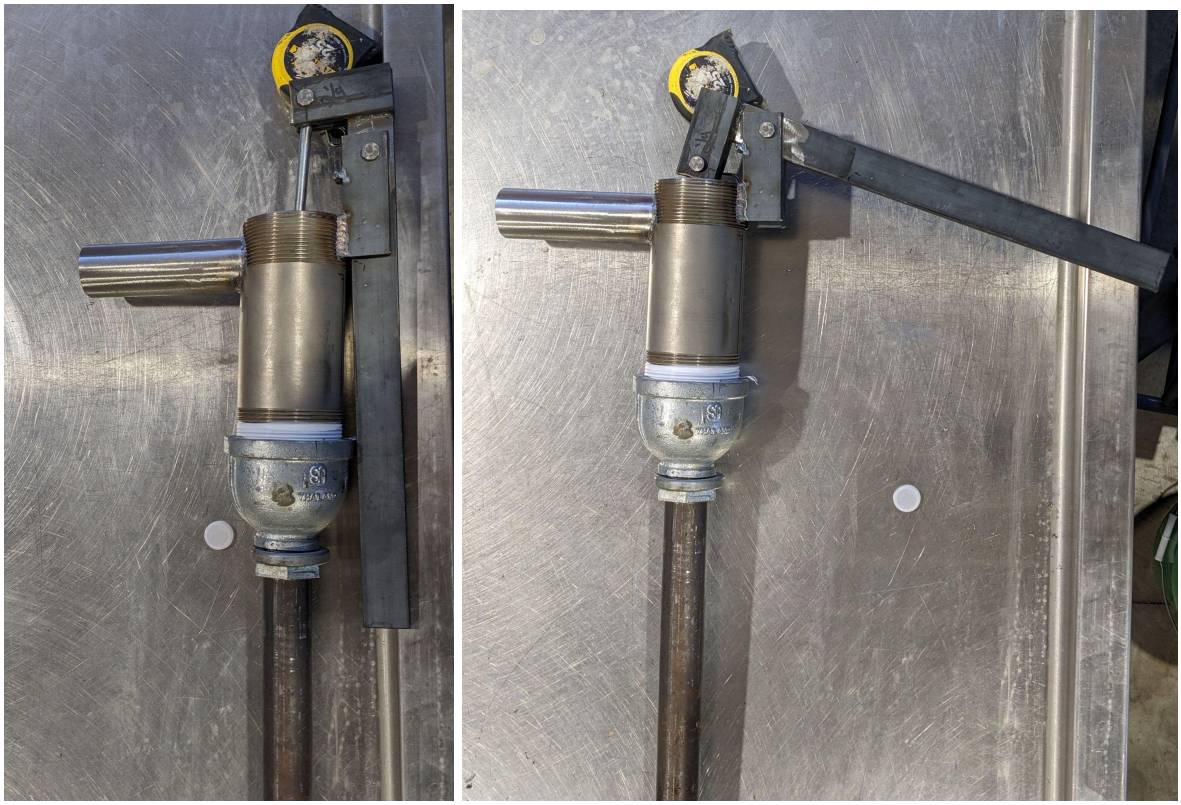
When I returned home I began to look at alternatives available on the US market. The pump needs not only to be very strong and easy to operate, but it also has to be serviced by people who may have never seen a wrench. I customized a sturdy cast iron pump built in Indiana (adding polymer bearings, stainless steel pins and fasteners) that addressed failure points of the original cast iron pumps. I ran this modified pump on a test stand to simulate one year of communal use. The simulation pumped 114,000 liters of water and completed over 576,000 cycles. Promising results.

Close up of the Indiana pump. Note polymer flange bearings and stainless steel clevis pins. August 12, 2021.

As the bench test was successful, the customized Indiana pump was shipped to Zambia and installed in Kalenge Village in October. It worked for three months until it was broke (cause remains unknown).

I returned to the drawing board in December. I was able to use the base of my original design where the well casing is coupled through the pump body. The pump body is a section of 3" steel pipe threaded into the galvanized base. The handle, fabricated from three pieces of common flat steel is connected to a bracket (two pieces of flat steel welded to the pump body) and a plunger with stainless steel pins sleeved with polymer bearings. The plunger is the same as

used in commercial pumps. Water exits the pump via a steel tube welded over a hole cut into the pump body. My pipe-fitter friend Garry Strange applied his talents to build a prototype.



The prototype depicted in full range of motion (the tape measure was used to prop the end of the handle for the photographs). January 31, 2022.

The next stop was to test it on a sandpoint well administered by Dr. Jonathan Levy at Miami University. The water table was about 17’ below the prototype. It worked. For comparison I also tested a new “store-bought” cast iron pump on the same well. It could not draw water. We now have a very strong pump that outperforms the commercial alternative that, and with importing a few small pieces, can be made in Zambia.

Testing the prototype at a sandpoint well adjacent to Four Mile Creek, Oxford Ohio. February 2, 2022

I also have good news to report regarding corporate donations and discounts. In October 2021 my pal Richard Hall contacted his friends at Pumps of Tennessee in Knoxville and they donated 80 sandpoints to the Project. On the way home from testing the prototype I received word from Campbell Manufacturing (Bechtelsville, PA) that they were donating 50 sandpoints,160

couplers and 60 drive caps to the Project. Campbell also extended a generous discount for an additional 260 couplings and 50 caps. I also heard from Boshart Industries (Milverton, Ontario, Canada) who offered to sell us brass check valves at a considerable discount. These donations and discounts now account for about 60% of total material costs. We now have enough sandpoint hardware for every village on the Matebele and Mulonga Plains!

Sandpoints, couplers and drive caps awaiting shipment from Union, Kentucky to Lusaka Zambia. February 10, 2022

I am assembling a large shipment (2,000 lbs) to arrive in Zambia this spring. I will revisit Zambia in June and secure the local steel components and meet with a fabricator who will cut and weld the pump body and handle.

I want to thank all who are making this possible, from corporations donating and discounting materials to scores of individuals who have supported this cause.
This will be the year it happens.

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