GARDEN WATER ACCESS PROJECT
FOR THE SCHOOL OF SCIENCE, ENGINEERING, AND HEALTH SYMPOSIUM DAY

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Our Project

In Western Africa there is a need for water to irrigate vegetable gardens during the dry season. The Garden Water Access Project has worked to produce drilling equipment and a pump for this purpose. This year we focused on testing the acceleration of our percussive well drilling bits and created a percussion well drilling manual.

Acceleration Testing

To test the drill bits, we created an accelerometer circuit and placed it in a waterproof container to attach to our two percussive well drilling bits. The goal of this testing was to gather data to see if the percussion bits decelerated by more than 70% when dropped through water. For this test we dropped the clay cutter and the rock bit through air, water, and slurry. We then took the data off of the accelerometer and made graphs like the one below:

Through numerical integration we were able to find velocity, displacement, and average kinetic energy from our acceleration data. Then we computed the kinetic energy in water versus the kinetic energy in air.

Drilling Manual

The final objective in order to conclude the project was to create a percussion well drilling manual.

This is the Table of Contents for the manual we made. This manual would span all of the things that we learned about percussive well drilling during our project.

Acknowledgements

Project Advisors - Joseph Longenecker, Brendan Earl
Research Mentors: Thomas Soeren, Tony Beers

Team Members

(Left to Right)

CONCLUSIONS

This year we completed the final goals of our project. We have designed and delivered new percussion well drilling bits, designed a working pump, and created a well drilling manual that covers all that we have learned from testing and research.