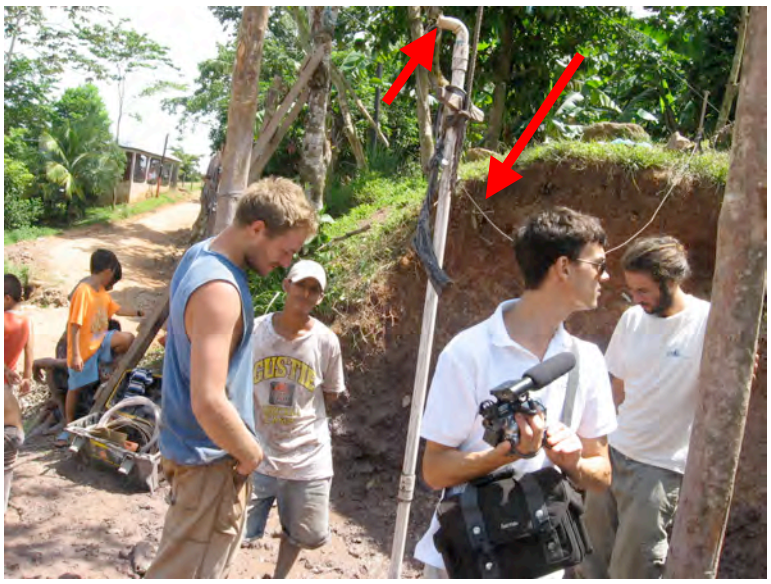
Well Drilling

This document is intended to give a brief overview of the EMAS method of drilling boreholes for a drinking water well as seen in Bluefields, Nicaragua.

This is the drilling apparatus. A pulley(red arrow) is attached in the middle of the cross beam to support the drilling.

Note the length of the most visible pipe segment(yellow arrows) which ends approximately at the elbow of the person in the white shirt. (~1.5m)

The rope coming diagonally towards the right of the camera(blue arrow) is tied off at this point to take up the tension of the drilling. This rope is manned by one or several people to pull the drilling shaft upwards.(illustrated further below.)

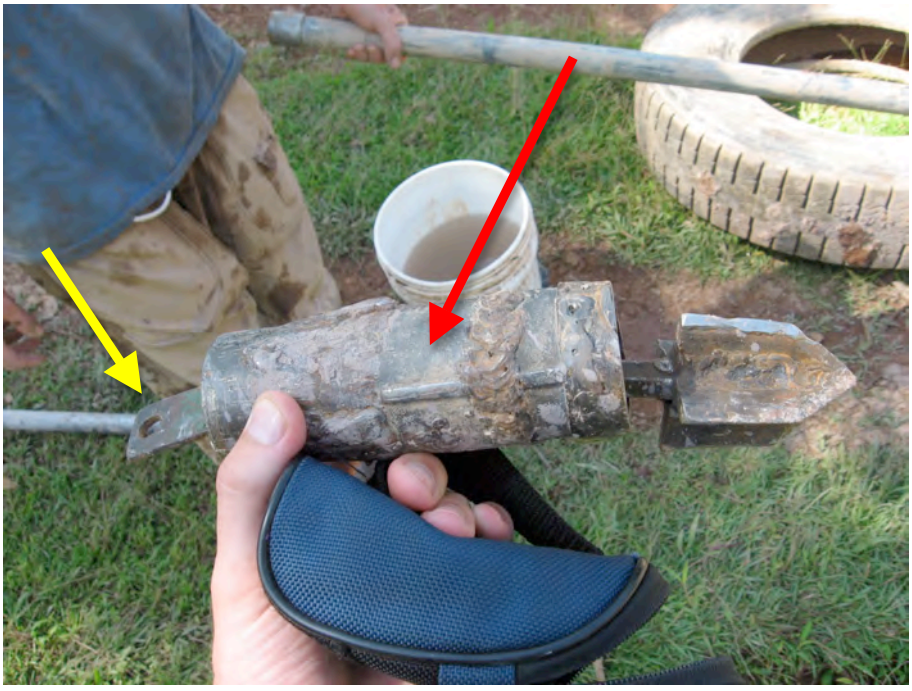


A more close up shot at the drill head which removes the sediment and soil. The handle at the top is lashed with rubber, (so that it can be removed quickly and easily) and another stick of pipe can be added fairly easily. The cable hanging(red arrow) from the top of the debris valve, running to the background on top of the hill is connected through the PVC piping to the drill bit at the bottom of the well.

The person over the well drives the drill downward, while the group of people gathered in the background(highlighted with the red circle) pull the rope,(red arrow) raising the drill to be driven back down again. In this set up, there were two teams of two pulling on the rope.

The person over the well, completely driving the drill down. Filling the hole with water. Note the valve at the top, with the steel cable running out(red arrow) attached to the drill bit) that flushes the water out.

The idea is to drill in 1.5m increments. The sticks(pieces of pipe) used were 3m, except for one piece of 1.5m. The 1.5 stick is attached, drilled down to about the height of the above photo, pulled up, the 1.5m stick replaced with a 3m stick, and the process is repeated. Once to the top of the 3m stick, the 1.5m stick is then added on and the process is repeated.



<u>The drill bit.</u>

The wire cable attaches to the hole at the left(yellow arrow). The drill head is connected to a check valve inside the cylinder(red arrow), which moderates the water flow through the pvc piping.

Note the welding marks on the cylinder.

Here is the link to a website containing more material on the EMAS method of well drilling.

http://liveearth.org/en/liveearthblog/drilling-boreholes-the-bolivian-way-the-emas-method

There are several adaptations and variations on the method, and googling "EMAS well drilling" or something along those lines should get more information.

I also had some freehand sketches of the drill bit and other aspects, but I hope you get the idea. When/if it surfaces I'll get it on here as well.