ETHOS Immersion Trip to Mbo Barombi, Cameroon
University of Dayton - OREPRID

Abstract

In the summer of 2017, Paige Lazar, Daniela Lopez, and David Ramsey traveled to Cameroon to work on and improve the existing water system and investigate expanding the system to include a community scale biosand water filter. The items the group addressed were:

- Corrected the elevation of a weir, or small dam, to facilitate flow
- Cleaned the catchment where Mbo Barombi sourced its water
- Designed and planned the implementation of a community-scale biosand water filter
- Improved the existing concrete point-of-use biosand water filters in villagers' homes
- Pushed for community responsibility and ownership for the projects in Barombi

Project Location

Mbo Barombi is a village of around 250 people that is located near Kumba in the Southwest region of Cameroon, a tropical central-west African country of about 24 million people[1]. Because of its tropical climate, there are many of water sources in Cameroon. However, the water is typically untreated in Sub-Saharan Africa where only 40% of water is improved [2].

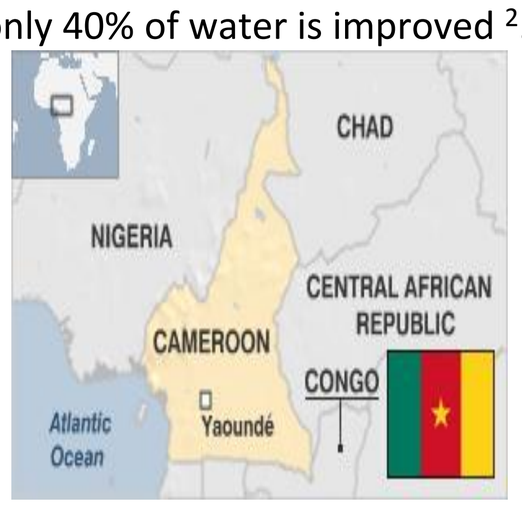

Figure #1. Map of Cameroon in relation to West Central Africa [3].

Introduction

The University of Dayton ETHOS program has had students travel to Mbo Barombi, Cameroon in 2007 and 2008 to install a water pipeline, in 2013 to construct point-of-use water filters, in 2016 to perform a road survey, and this past summer. The 2017 team explored a community-scale biosand water filtration system because of its benefits:

- Does not need electrical power or a pump
- Filtering materials are sand and gravel which are globally available
- Cleans water of debris and pathogens using the biolayer, a naturally occurring living filter
- One large filter is easier to maintain than each house having its own filter

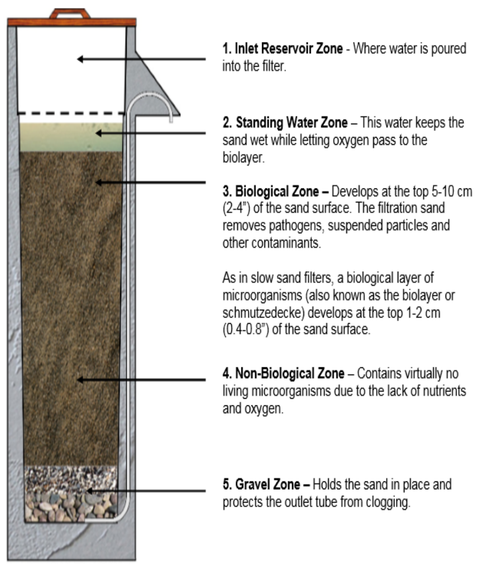

Figure #2. Picture of point-of-use biosand filtration system [4].

Lastly, the group wanted to clean the catchment where water was piped into the village, to the taps, and finally used as cooking, drinking or cleaning water. The catchment area had become overgrown and dirty. The weir that controls the amount of water held upstream and concrete dam had been modified by a local engineer who constructed a faulty filter that wasted the village's time and the government's money.

Biosand Water Filters

The point-of-use biosand water filters were a good temporary fix for the water quality issue in Mbo Barombi. However some issues have arisen including:

- Clogged outlet tubes
- Lack of knowledge or will to properly maintain filters
- Growing population needs more clean water which means more filters

Figure #3. Villagers work to optimize placement of operating filters.

Because of these problems, it was decided that a community biosand filter would work better in this village. Unfortunately, the ETHOS team found that they lacked both time and money to accomplish this. However, they were able to design and plan the construction of the large concrete filter for the next summer. The team also decided to revitalize the existing filters to provide Mbo Barombi with clean water until the project can be completed.

Figure #4. Barombi children pose with cleaned sand and gravel.

Sand and gravel were purchased and transported by truck and canoe into town where it was sieved and washed repeatedly until clean. The ETHOS team then went house-to-house and cleaned out the old dirty sand from the existing filters, refilled abandoned filters, and taught the locals proper maintenance procedures.

Catchment/Weir Fix

When the ETHOS group arrived, the catchment was overgrown and had collected a large amount of mud, leaves, and other debris upstream of the concrete dam. Also, the weir was too high and allowed a deep stagnant pool to form.

Figure #5. Catchment and weir prior to clean-up.

After the village council approved community clean-up, the weir was brought down to its original height and the catchment itself was much cleaner. In town, the villagers could see the improved water quality because there was significantly less turbidity, or cloudiness present.

Figure #6. Downstream view shows cleaned catchment and improved water surface elevation.

Acknowledgements

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