GRAVITY FED WATER

Prepared by: Shung Yen Tan

The Need

Imagine having to walk a few miles in order to get access to clean water so that you can take a shower or make a cup of coffee. This is the problem experienced by villagers of a rural village on the island of Lombok, Indonesia.

Without easy access to clean water, health risks will increase among the villagers. Furthermore, simple tasks such as washing clothes are severely hindered and can become difficult and tiring tasks instead.

The Solution

A gravity fed water system is a sustainable water system that can transport water from a nearby spring located on a mountain to the village in Lombok with zero energy footprint.

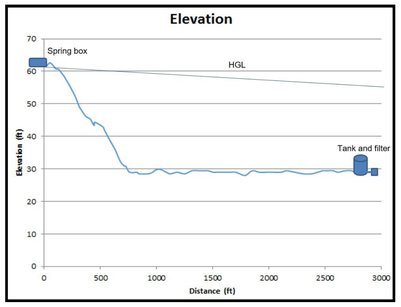
The Partner

The Gravity Fed Water project partners with Access Life International (ALI) to collaborate with and serve our brothers and sisters in Lombok, Indonesia.

The Gravity Fed Water System

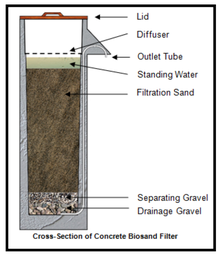
Our gravity fed water system consists of three main parts:

1. Piping
   - Based on ground elevation, distance of the spring from the village, and the resources available in Lombok, we determined that 2782 ft of pipe will be needed to connect the spring to the village as illustrated in the image on the right. In addition, it was found that 2 inch diameter pipes are most suitable for the system in order to obtain an average flow rate of 8 gallons per minute.



2. Ferro cement tank
   - A ferro cement tank was designed in order to collect water in the village so that the villagers can have access to water at any time of the day.

3. Bio-sand filter
   - In order to ensure that the water from the spring is safe to be consumed by the villagers, a bio-sand filter was designed to be used with the gravity fed water system. The filter will be connected to the ferro-cement tank.



Project Impact

In line with the Collaboratory's vision to increase hope and transform lives through education, collaboration, innovation, and service, the Gravity Fed Water project hopes to impact the lives of the villagers of Lombok through three different ways:

- Reduce health risks among the villagers in Lombok, enabling them to embrace the right to a healthy and full life.
- Reduce the amount of time needed to complete simple tasks so that they can use that time for more productive activities such as educating their children, learning new skills or earning money to support their families.
- Showing love to our brothers and sisters in Lombok through the excellent practice of engineering skill.

Acknowledgements

Project members:
Frederic Warden (Student Project Manager)
Nolan Goss
Shung Yen Tan

Advisor:
Dr. Thomas Soerens

Unless the Lord builds the house, those who build it labor in vain.
Psalm 127:1

Messiah College · Department of Engineering · the Collaboratory for strategic partnerships and applied research