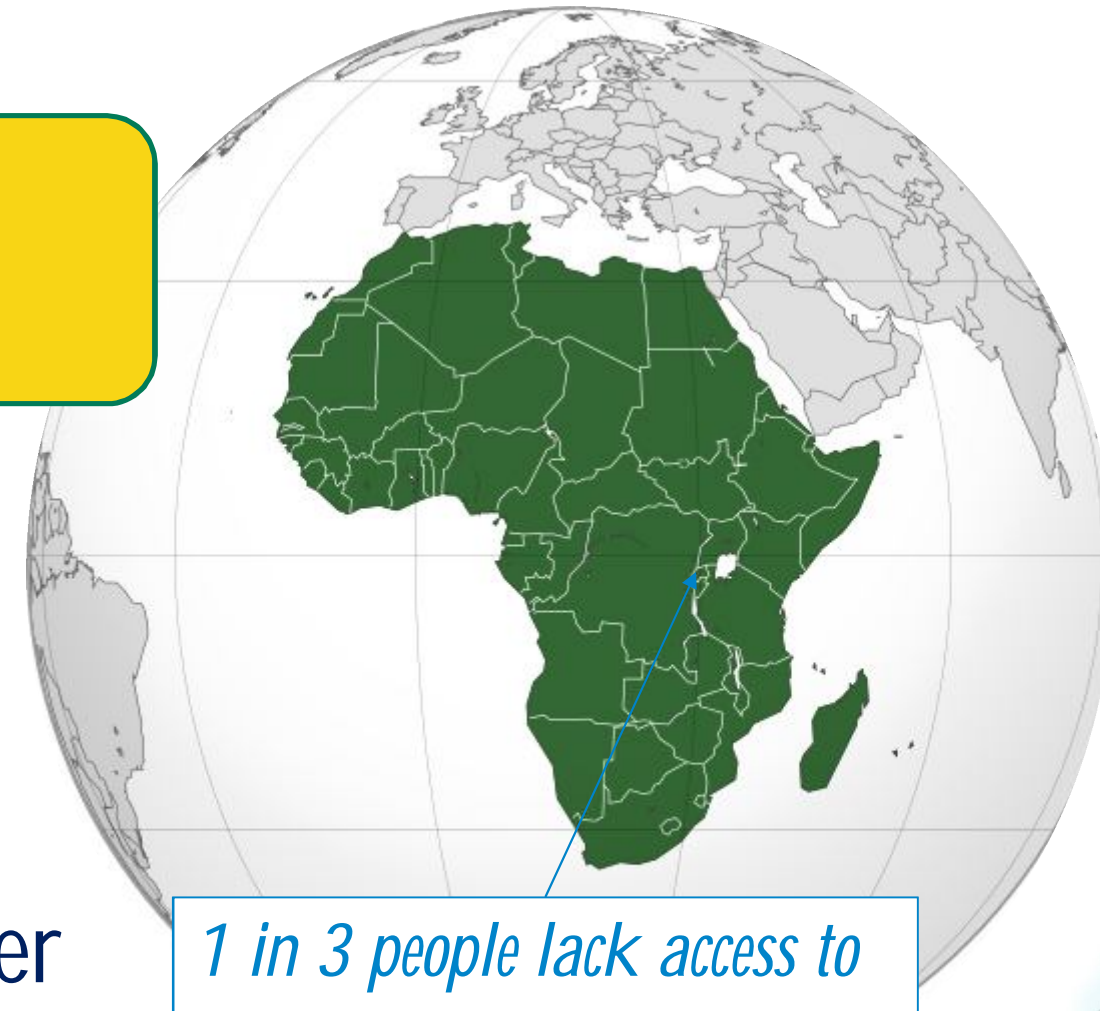


# Background

In Central Africa, access to basic waste sanitation services is lacking, often resulting in open defecation.

**Access** to sanitation can result in better health & improved water quality.



1 in 3 people lack access to improved waste sanitation technology in Rwanda 1



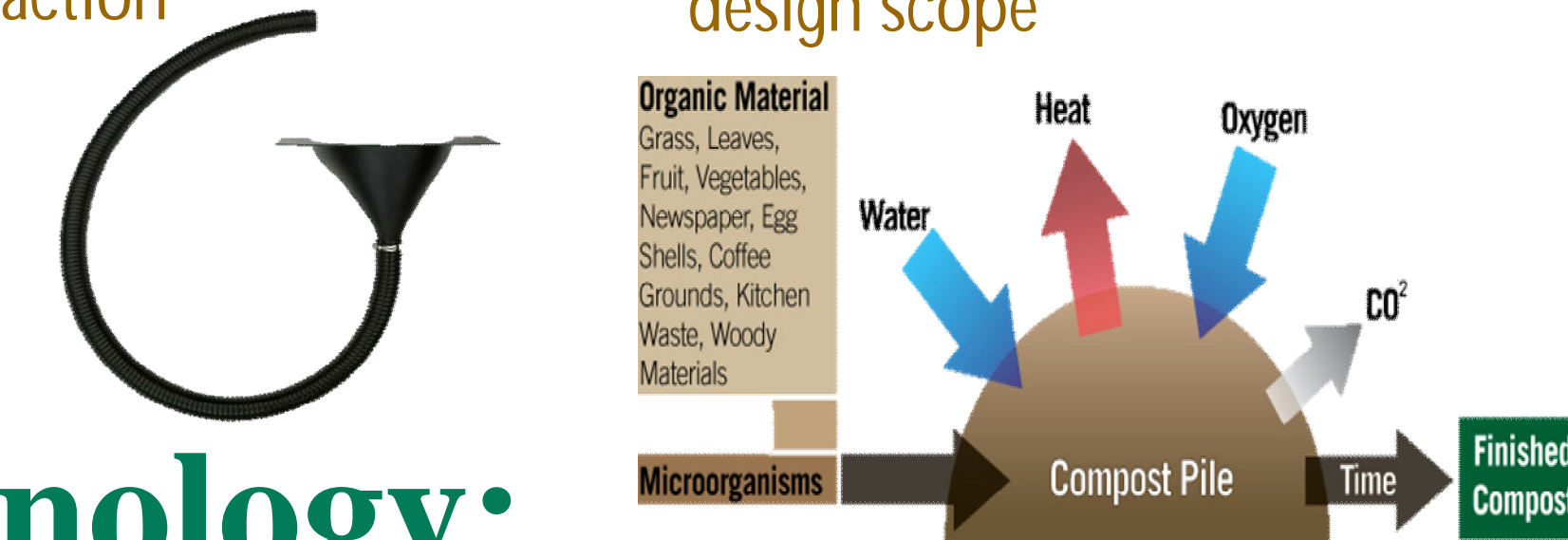
**Objective:** develop a sustainable holistic solution to waste sanitation for the community of Rilima, Rwanda.

# Future Work

**Long term** the latrine will be scalable to the entire community (206 families) and will generate local jobs as a social enterprise in Rilima, Rwanda.

Refine urine diversion to improve user interaction

Incorporate extended-composting process into design scope



# Improving Sustainable Waste Sanitation Technology:

## Ecological Sanitation Latrine Design

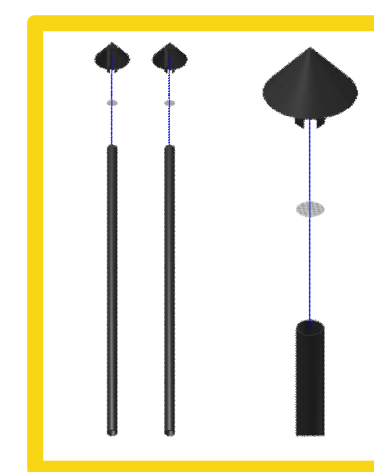
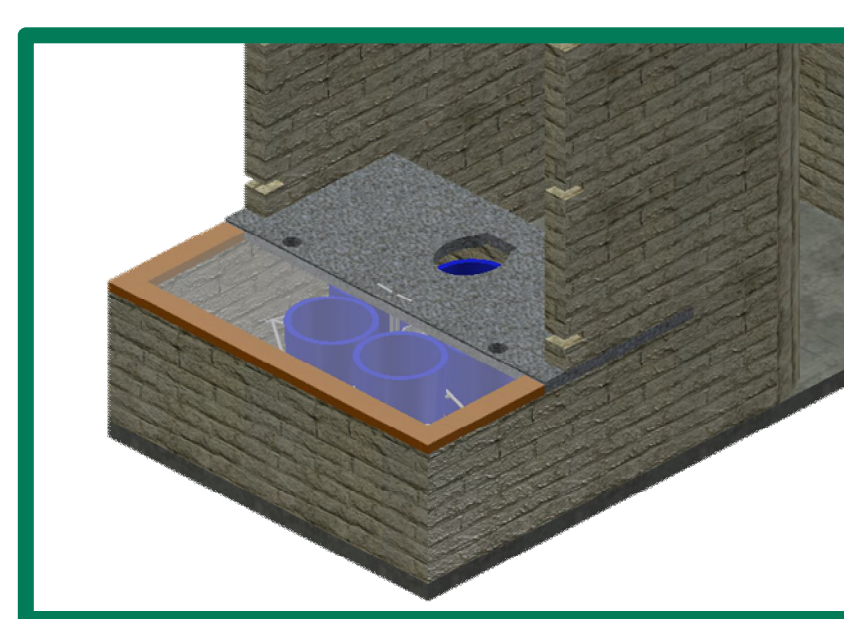
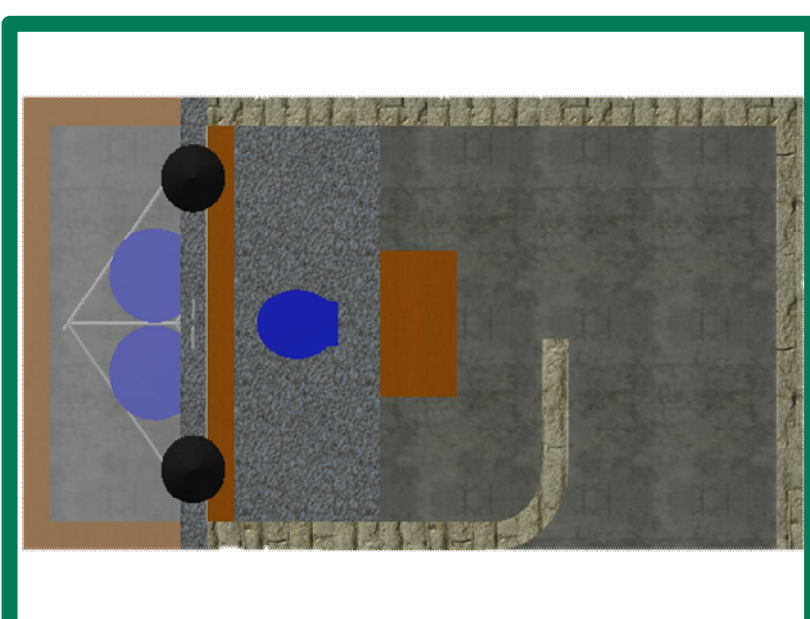
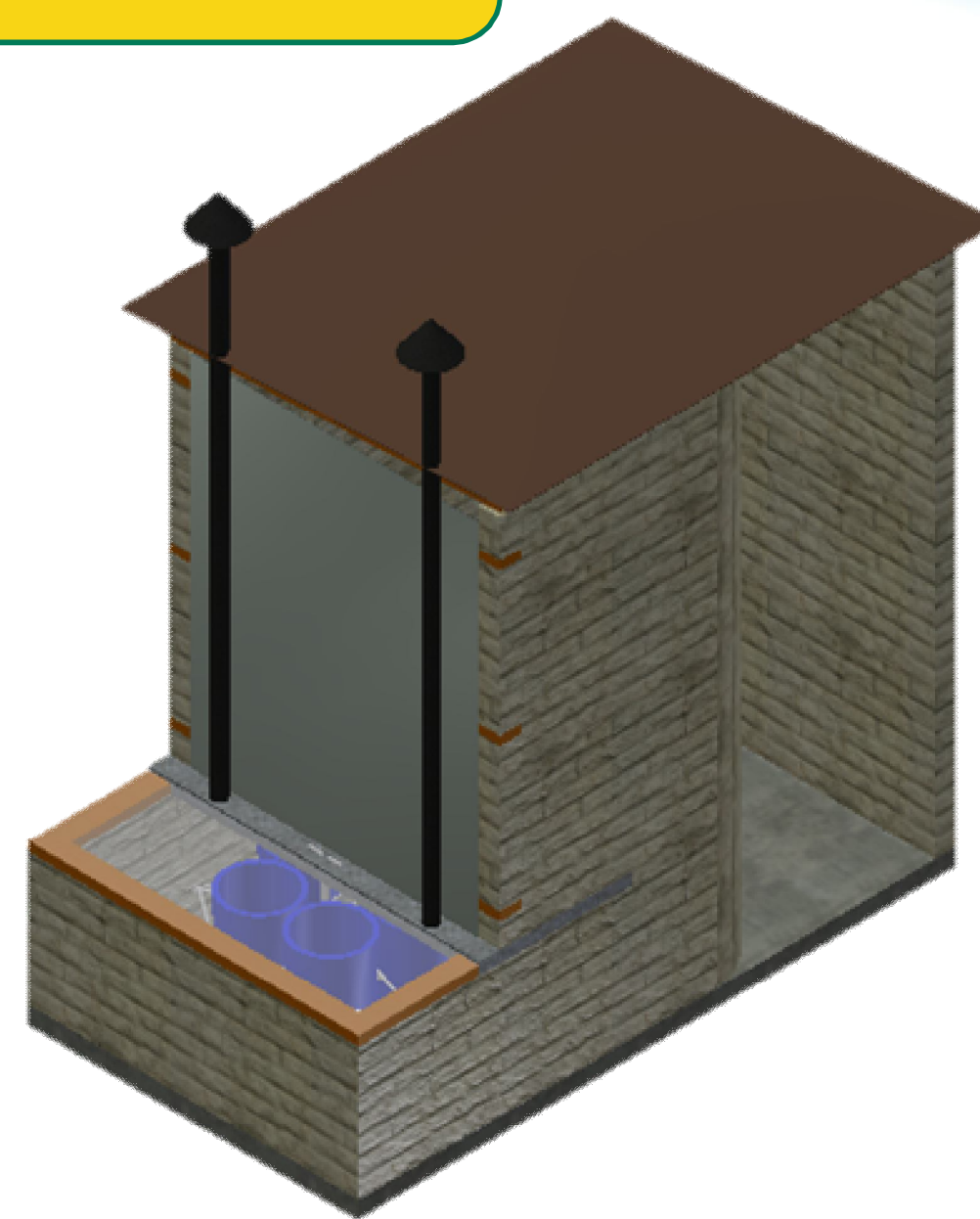
Brooke Baugher, Jamie Bourgeois, Nathan Miller, Tyler Mueller  
Mechanical Engineering Senior Design, Team 38

**Advisor:** Dr. Kevin Kochersberger  
**Client:** Desire Rwagaju & Rilima Community

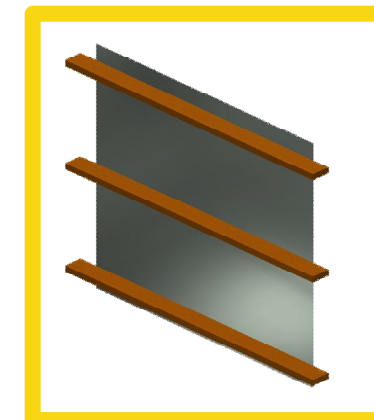
# Detailed Design

The design uses locally sourced materials and skills to create a sustainable & repairable technology.

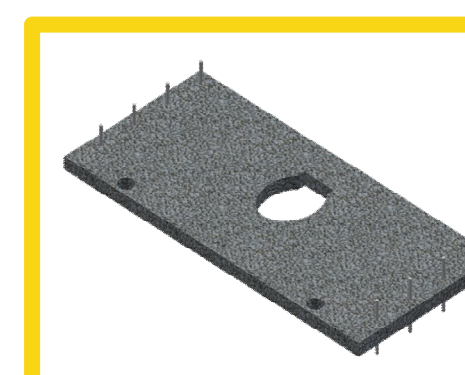
Eco-sanitation based technology allows for a compostable output, improving the soil quality & crop yields. 2



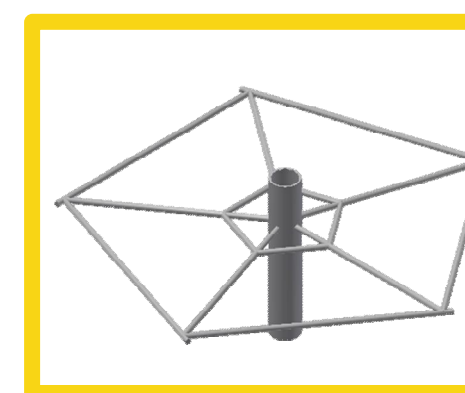
**Ventilation Improved Piping** heats the air inside the pipes to draw odors & fumes away from the user's space.



**Corrugated Tin Back Wall** allows for weight reduction on the slab, as well as light redirection into the compartment.



**Concrete Poured Slab** provides a seat, reduces load on back wall, prevents odor capture, & creates mounting spaces for urine diversion and VIPs.



**Welded Carousel** increases waste capacity, basket supports buckets, steel-on-steel contact allows smooth rotation

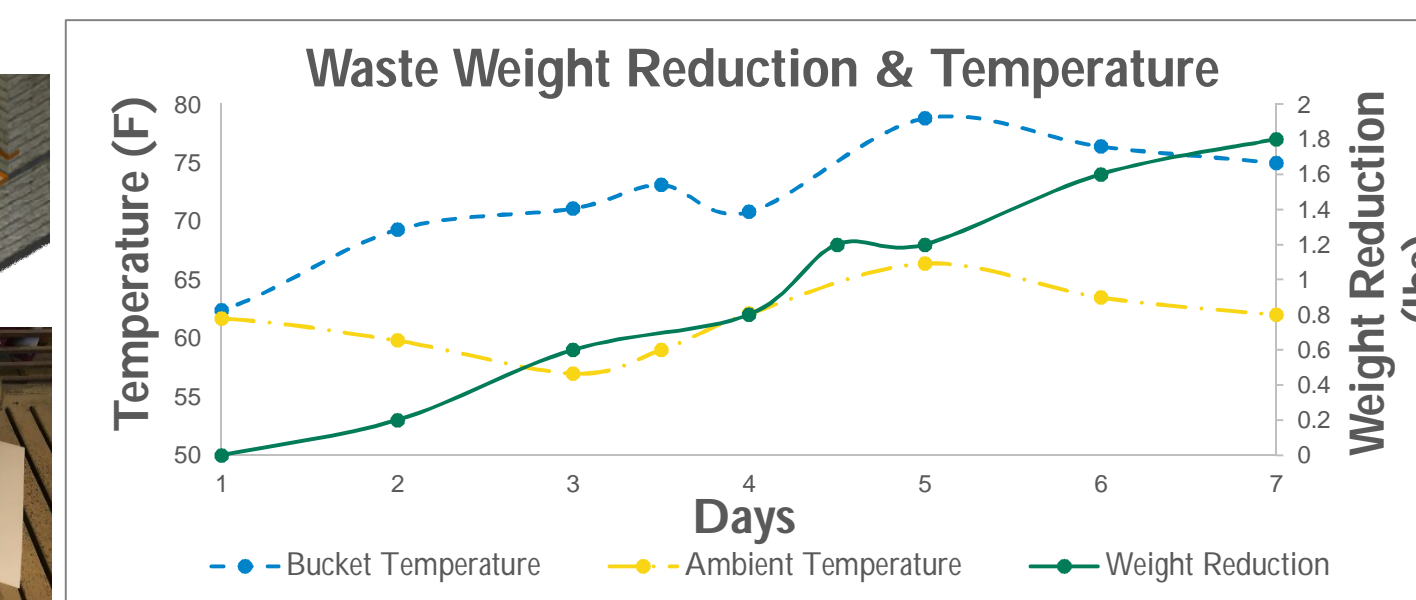
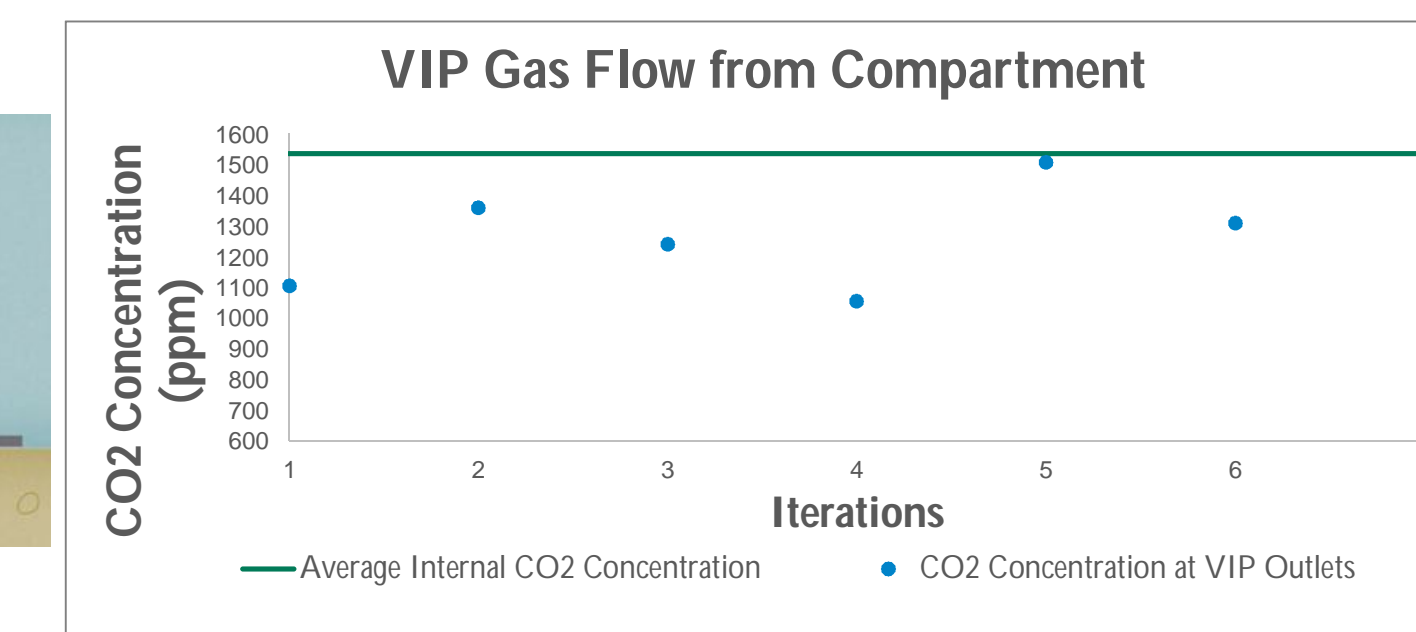
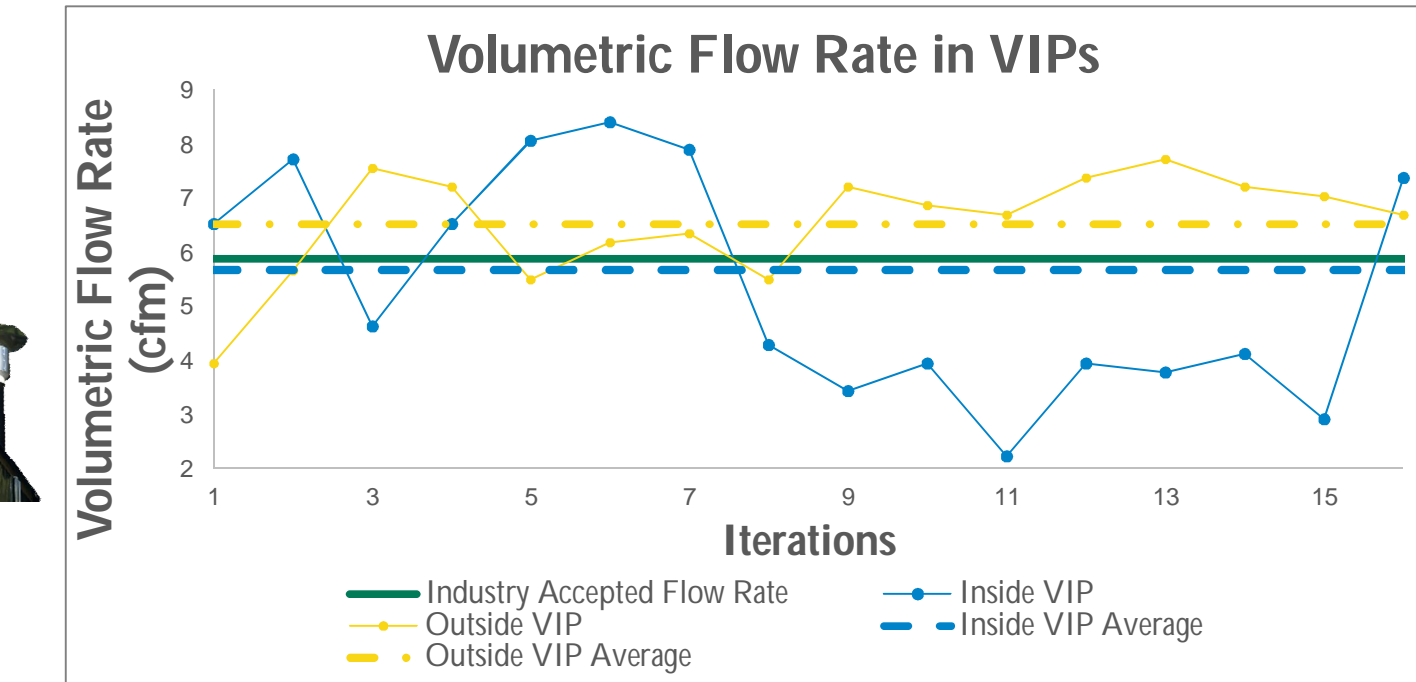
# Testing & Results



The latrine was used as a data collection learning lab.

**Airflow Testing** showed that the Outside VIP's maintained airflow rates greater than industry-accepted rates 4 to minimize odor.

**Waste Weight Reduction Testing** resulted in a 2 lbs loss over 1 week.



### References

- [1] <http://data.worldbank.org/indicator/SH.STA.ACSN?end=2015&start=2015&view=map>
- [2] <http://aquamor.info/sanitation-technology.html>
- [3] \*Door design based off of: [http://www.ecosanres.org/toilets\\_that\\_make\\_compost.htm](http://www.ecosanres.org/toilets_that_make_compost.htm)
- [4] <http://documents.worldbank.org/curated/en/412331468199470290/Ventilated-improved-pit-latrines-vent-pipe-design-guidelines>