The Effects of Decentralized, Thermophilic Compost Sanitation on Health and Wellbeing in the Primary Schools and Households of Uganda's West Nile Region

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INTERNATIONAL MEDICAL OUTREACH

Globally, 2.3 billion people lack basic sanitation service with 892 million people still practicing open defecation.

Inadequate waste management and open defecation contaminate drinking water, contributing to the transmission of infectious diseases like diarrhea, cholera, typhoid, and soil transmitted helminthiasis (STH). These and other diseases associated with poor sanitation account for 10% of the global disease burden. According to the World Health Organization, the deaths of 361,000 children under 5 years old could be avoided each year by addressing water and sanitation risk factors.

Compost sanitation represents an alternative solution in areas where sanitation infrastructure is inaccessible. Especially in rural areas where the effects of inadequate sanitation are most evident, compost sanitation is a potential pathway towards the restoration of health and wellbeing.

Not only does thermophilic compost sanitation limit fecal contamination, it produces valuable organic fertilizer that can be used to increase crop yield. Furthermore, because composting simply creates the optimal environment for the natural decomposition process to occur, it is locally replicable without the need for infrastructural investment or external elements.

By introducing and encouraging the use of compost sanitation in a decentralized manner, its organic spread develops through individual choice unconstrained nor imposed by technocratic oversight.

METHODS

In January 2015, the prevalence of soil-transmitted helminthiasis (STH), or intestinal parasites, among primary-school children in Uganda's rural West Nile Region was tested via microscopic examination of a stool smear. This process of observing and identifying eggs in the feces under a microscope is suitable in determining the presence of ascariasis, enterobiasis, hookworm infection, and strongyloidiasis and can be performed on site, given that there is a power source for the microscope.

In April 2016, thermophilic compost sanitation was launched in Papoga's five primary schools and eight brave households. Since then, the use of compost sanitation has spread organically with IMO's guidance to over 500 households across 45 different villages.

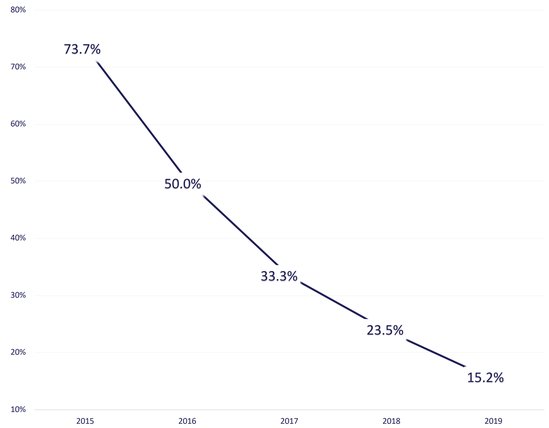
After the initial stool testing in January 2015 and the launch of compost sanitation in April 2016, stool analysis was performed in the primary schools yearly in October 2016, October 2017, October 2018, and October 2019.

In October 2018, stool analysis was also performed on primary school-age children *not in school* in the villages of Olalo and Olieko. After 55% (31 of 56) of households in Olieko and 94% (94 of 100) households in Olalo adopted compost sanitation, stool analysis was again performed on primary school-age children *not in school* in both villages.

RESULTS

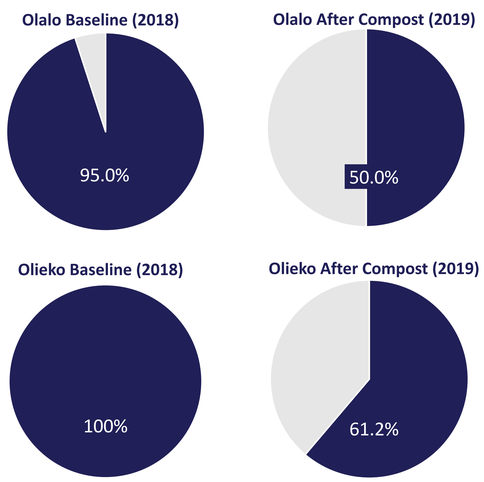
STH Prevalence Among Primary School Children

The STH prevalence among primary school children fell from 73.7% in January 2015 to 15.2% in October 2019.



STH Prevalence Among Children Not in School

The STH prevalence in Olalo and Olieko among primary school age children *not in school* fell from 95.0% to 50.0% (Olalo) and 100% to 61.2% (Olieko) after a majority of households in both villages adopted compost sanitation.



CONCLUSIONS

Open defecation and pit-latrines are the standard methods of waste management for millions of people worldwide. Yet, these methods are globally among the main routes of transmission for intestinal parasites and other enteric diseases. Our results suggest that the use of compost toilets represents a sanitation solution that fits the rural, agricultural lifestyle of many people without access to other forms of waste management.

We have also shown that the process is sustainable. There was no need for the importation of materials, technology or equipment. Agricultural areas are rich in the materials necessary to harness and accelerate this natural process that breaks down pathogens in human waste in the process of creating organic fertilizer. We used local materials, local labor, and local ingenuity to make compost toilets replicable throughout each community. We also were able to train compost toilet users in the basic science, protocol, and proper techniques of compost-based sanitation. Moreover, even in the minds of the local community, our results have connected the mismanagement of human waste with high rates of intestinal parasites and other enteric diseases.

These findings suggest that compost sanitation reduces fecal contamination in the environment and, thereby, contact with fecal-transmitted organisms. Further, natural decomposition requires no infrastructure in transforming disease-transmitting feces into pathogen-free fertilizer.