



PROGRAM

Between 2008 and 2016, The Water Trust partnered with more than 300 communities in rural Uganda to improve access to clean water, sanitation, and hygiene. While The Water Trust also partnered with schools and health centers, village partnerships account for the significant majority of past projects. The village partnership consists of three phases: village selection, construction and training, and ongoing monitoring and support.

- **SELECTION:** Outreach to rural communities without access to clean water and securing village commitment to contribute meaningfully to the construction of the well, including labor and materials.
- **CONSTRUCTION AND TRAINING:** Construction of a well (typically a shallow hand-dug well); sanitation and hygiene promotion activities focused on eliminating open defecation; formation of a water and sanitation committee and training of the committee on the collection of user fees and regular maintenance.
- **MONITORING:** The Water Trust staff performs annual monitoring of the infrastructure, water quality, and health outcomes of community members, with case-by-case support offered to enable the community to maintain the well.

EVALUATION

The Water Trust assesses community infrastructure and surveys households on hygiene and sanitation behaviors and health outcomes before each partnership. Changes in these indicators are monitored with follow-up surveys each year. In 2016, The Water Trust conducted an analysis of all data collected since 2008, and conducted focus group discussions with community members to better understand and contextualize the data. This note summarizes both the findings from this analysis and the implications for The Water Trust's programs. See page 4 for additional details on the data and methodology.

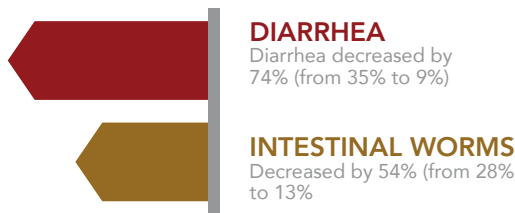
KEY TAKEAWAYS

- Households report significant improvements in health outcomes associated with access to water, sanitation, and hygiene, notably decreased diarrhea and intestinal worms. Diarrheal disease is responsible for more than a quarter of under-five child mortality in Uganda.
- Improvements in health are likely due to the program's construction of a reliable local water source and the elimination of open defecation.
- The program did not successfully equip local communities to maintain their wells independently, nor to adopt critical hygiene practices (e.g., handwashing with soap). Continued well functionality is dependent on The Water Trust's ongoing support.
- The Water Trust has responded to its lessons learned with adjustments to its programs. In Fall 2016, The Water Trust launched a new sustainability initiative to pilot three distinct approaches to equip communities to operate and maintain their wells, and has likewise invested in additional community coaching on good hygiene. In 2017, The Water Trust is set to launch new programs in the school and health center settings with an emphasis on building healthy habits in children and ensuring a hygienic setting for medical care.



RESULTS

HEALTH OUTCOMES



WASH

- Mixed results for other WASH-related outcomes

MALARIA

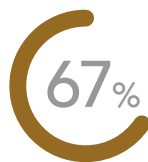
- Remained a significant health burden in communities

Water, Sanitation, and Hygiene (WASH) programs are associated with improvements in: diarrhea, intestinal worms, respiratory infections, typhoid, dysentery, eye infections, and skin rashes. The Water Trust collects data on all of these health outcomes, as well as malaria, a significant health problem in the area, by asking households whether they have had a health event in the prior two weeks. Of the WASH-related indicators, diarrhea is the most critical health outcome, as it contributes to malnutrition, stunted growth and development, and can be life-threatening for children under five.

ACCESS TO WATER



HOUSEHOLDS REPORT NO WATER PROBLEMS
(compared to 2% at baseline)



HOUSEHOLDS SPEND LESS THAN 30 MINUTES TO TRAVEL FOR WATER
(compared to 34% at baseline)



NO BACTERIAL CONTAMINATION*
High (11-100 CFU/ML): 22%
Low (<1 CFU/ML): 78%

There are multiple dimensions that define a household's access to water: functionality and reliability of the well, accessibility or distance of the well, and the perceived and actual quality of the well's water. An examination of observed E. coli contamination revealed that the majority of reports of "high" contamination were due to seasonal contamination. Seasonal contamination occurs during the rainy season, when the rains put shallow-hand dug wells (like the majority of those constructed by The Water Trust) at greater risk of contamination from nearby feces or waste than deeper (and more expensive) borehole wells.

*E. coli is an indicator of bacterial contamination, often from animal or human feces. E. coli contamination is measured by the number of colony-forming units per milliliter of water (CFU/ML).

HYGIENE & SANITATION



OPEN DEFECAATION
• Decreased from 30% of households to 1%



HANDWASHING
• Only 8% of households reported a handwashing station at home (from 5% at baseline)



BASIC HYGIENE
• Improved significantly, from 47% of households to 79% (but only 13% adopted all or near all good practices)



CLEAN STORAGE
• Only 12% of households practice clean storage and use of water in the home (from 0% at baseline)

Household hygiene and sanitation behaviors play a critical role in avoiding the contamination of the water and the spread of disease through feces, fluids, floors, flies, fingers, and/or foods. The elimination of open defecation, hand washing with soap, and maintaining a safe water chain from source to use are strongly associated with improved health outcomes.

OPERATIONS & MAINTENANCE

59%

SANITATION COMMITTEES
• Only 59% of communities had a functional water and sanitation committee

72%

SAVINGS
• 72% of communities had funds saved for maintenance

\$19

FUNDS FOR REPAIRS
• Communities with savings had only \$19 on average. A repair might cost \$40-\$75

The sustainability of infrastructure depends on the community's ability and motivation to contribute and manage user fees, and contract mechanics for maintenance and repairs. Communities typically rely on local volunteers to form a Water and Sanitation Committee to maintain the well. The amount of funds held in reserve is a key indicator of the community's capacity to sustain the infrastructure in the event of maintenance issues.

CONCLUSIONS

The Water Trust's village partnership program improved critical health outcomes by creating access to clean water in local communities and virtually eliminating open defecation. At the same time, the program failed to adequately address critical gaps in hygiene and sanitation practices, as well as operations and maintenance practices.

Shortcomings in hygiene and sanitation behavior change can be attributed to inadequate investment in community training and a focus on transmitting conceptual knowledge rather than coaching community members on an ongoing basis. At the same time, the lack of opportunities for children and their families to practice good hygiene in school and at health centers may have contributed to the low valuation of hygiene and the poor habits observed.

While access to clean water improved dramatically, there remain residual seasonal contamination issues for a minority of wells. This risk can be mitigated through improvements to construction design, promoting alternative water cleaning technologies during the rainy season, and/or investing in deeper wells. Poor operations and maintenance can be attributed to inadequate investment in capacity building, and a mistaken assumption that by requiring the community to contribute to the project initially, they would "own" the project and therefore perform the needed operations and maintenance tasks.

Finally, the community's health was significantly affected by the prevalence of malaria, with the efforts of past government programs failing to reduce the significant burden on households.

LESSONS LEARNED

- It is necessary to explore alternative approaches to equipping communities with the assets, skills, and motivation to operate and maintain wells independently. Three pilots of new approaches were launched in Fall 2016 with results expected in Fall 2017.
- Critical behavior change around hygiene requires greater investment in coaching, and should be addressed in multiple settings at formative moments in value and habit formation (e.g. school-age children in schools; caregivers before and after birth in health centers and villages). New school and health center programs emphasizing hygiene habits and values are set to launch in 2017.
- It is necessary to explore new construction designs that further minimize seasonal contamination as well as alternative approaches, from chlorine dispensers to borehole wells. The Water Trust began iterating new construction designs in Summer 2016 and will review the results in Summer 2017.
- There are likely low-cost activities related to critical community essentials, such as malaria prevention and treatment, which can be implemented by The Water Trust in conjunction with its water, sanitation, and hygiene activities. The Water Trust is piloting several of these activities in 2017.

METHODOLOGY

DATA

For the purpose of this analysis, only sites with a baseline assessment completed after January 2015 and with a corresponding monitoring survey were considered. The baseline surveys were conducted prior to the construction phase. The monitoring surveys were conducted approximately one year after the completion of the construction and training phase. The sample was limited to surveys completed after January 2015 as the data quality improved notably at this time, and several questions related to health outcomes were introduced.

The sample consists of 25 communities with a sample of 856 households at baseline and a 425 households at monitoring. This discrepancy in sample size is because 25-50% of households are sampled in the monitoring surveys. Results from focus group discussions conducted in July-August 2016 also informed the interpretation of the data. The survey data was transformed using R to create relevant variables and calculations. The relevant code and documentation is available [here](#).

LIMITATIONS

There are several limitations to this descriptive analysis. First, in some cases, the survey design has weaknesses that reduce the reliability of the results. For example, community members were asked if they had "diarrhea" in the last two weeks, which is subject to greater interpretation and confusion than best-practice questions on this topic. Second, due to concerns about data quality, the sample size of this analysis is limited to recent projects, and we are unable to make conclusions about longer-term results. Finally, as this is an observational study without a control or comparison group, there is a greater risk that there are confounding factors that are producing the change we observe in the data.

IMPLICATIONS FOR FUTURE RESEARCH

The Water Trust will be enhancing its monitoring and evaluation in several ways in order to better estimate our impact. First, we are redesigning the household surveys to align with best practices in survey design. Second, we are introducing, where possible, more objective methods to measure behavior change, such as observing at a school what percentage of children wash their hands after using the latrine. Third, we are pursuing research partnerships that will allow us to launch a randomized controlled trial of our programs in village, schools, and health centers in early 2018.

DATA POINTS

	Baseline	Endline
Health events reported in past two weeks		
Diarrhea	35%	9%
Typhoid	14%	6%
Malaria	75%	71%
Dysentery	1%	0%
Respiratory infection	33%	20%
Skin infection	8%	14%
Eye infection	2%	6%
Functionality (average spot check)		
Full		93%
Partial		7%
No		0%
Reliability (non-functional for <2 weeks in past year)		98%
Distance to water point		
<30 minutes	34%	67%
30-60 minutes	47%	33%
60+ minutes	19%	0%
Water problems		
0	1.5%	92.7%
1	79.2%	4.3%
>1	19.3%	3.0%
E.coli contamination (average spot check)		
Low	78%	
Intermediate	0%	
High	22%	
Very high	0%	
Safe water chain		
Few (<2)	28.6%	50.2%
Some (3-4)	70.7%	43.6%
All (5)	0.7%	6.2%
Household hygiene practices		
Few (<2)	53.5%	20.9%
Some (3-5)	43.7%	65.7%
Most (>6)	2.8%	13.3%
Handwashing facility	5%	8%
Sanitation		
Open defecation	30%	1%
Use neighbor's latrine	6%	10%
Basic latrine	40%	44%
Ideal latrine	25%	45%
Functional water user committee		59%
% with any savings		72%
Average savings		\$19
Sample size		
Households	856	425
Villages	25	25