

Determinants of Household Drinking Water Quality in Rural Ethiopia

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Background

- Lack of access to safe & adequate water supply, & the health risks associated with water-related diseases are major public health problems in many developing countries.
- In Ethiopia, only 49% rural households have access to 'improved' water sources (WHO/UNICEF 2015).
- This definition of access to 'improved' water source does not consider the quality of the water; consequently, it does not reliably predict neither the microbiological nor the physiological quality of the water being consumed.

Study Objective

- To investigate the key drivers of poor quality of stored household drinking water and community water sources in rural areas of Fogera and Mecha districts.

Study Areas

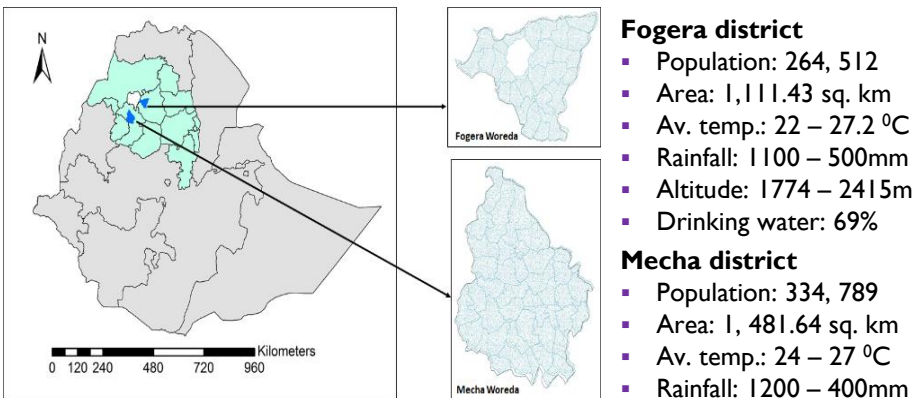


Figure 1: Map of the study areas

Data and Methods

- A stratified two-stage cluster sampling was used to select 454 sample households (277 hh from Fogera & 177 hh from Mecha district).
- A household survey conducted between February and June 2014
- Water samples quality testing conducted for
 - 454 stored household drinking water, and
 - 61 community water sources for the presence of Escherichia coli (*E.coli*) bacteria (CFU/100ml water) using membrane filtration method.

Results and Discussion

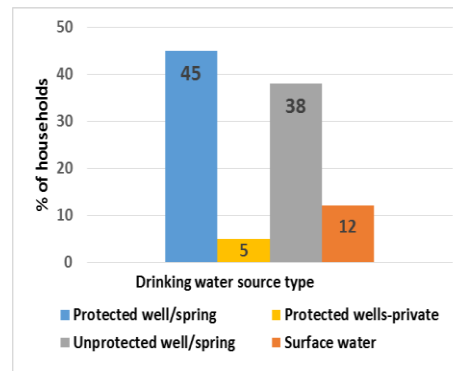
- Based on the JMP definition, 50% of our sample households have access to improved drinking water sources.
- 58% of the water samples from household's drinking water storage is contaminated with *E.coli* (at least 1 *E.coli* CFU/100ml water).

Table 1: Community water source sample test results

Source type	N	Contaminated water sources		Mean <i>E.coli</i> per 100ml
		Column percentage	Row percentage	
Protected wells/spring	29	37.78	58.62	6.83
Unprotected wells/spring	26	48.89	84.62	34.46
Surface water sources	6	13.33	100	61.33

Source: Authors' computation using survey data.

Share of households by drinking water source



Share of households with *E.coli* by drinking water source

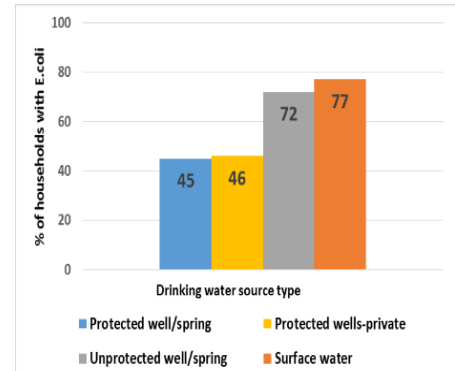


Figure 2: Drinking water source types and stored drinking water contamination

Table 2: Multivariate regression for stored household quality

VARIABLES	Odd ratio	SE	OLS	SE
Primary water source (ref. protected well/spring)				
Unprotected well/spring	1.889**	0.532	0.315**	0.155
Surface water	1.111	0.419	0.235	0.233
Water collection time (I=30min/less)	0.372**	0.155	-0.911***	0.220
Container (I=Jerry can)	3.570***	1.291	1.086***	0.186
Highest education completed	0.899***	0.036	-0.051*	0.026
Household size	0.878	0.085	-0.120**	0.056
Household density	1.490***	0.175	0.351***	0.066
Handwashing with soap	0.373***	0.112	-0.611***	0.162
Livestock units	1.288***	0.096	0.166***	0.040
Irrigation farming (I=yes)	1.507	0.407	0.439***	0.137
Water user group (I=yes)	0.146***	0.051	-1.419***	0.177
Pit latrine (I=yes)	0.847	0.234	-0.510**	0.243
Water source location (I= on premises)	0.607	0.244	-0.446**	0.037
Pit latrine X water source location	1.418	0.768	0.567**	0.267
Pseudo/R-squared	0.35		0.45	
Model Chi2/F-Test	185.81		68.18	
Model p-value	0.000		0.000	

Robust standard errors adjusted for clustering at the village level;

Significance level *** p<0.01, ** p<0.05, * p<0.1

The OLS model predicts the natural log of *E.coli*.

The models are also controlled for proportion of adult women & garbage disposal behaviors.

Conclusions and Policy Implication

The study suggests that there is a need to promote water safety along the POS to POU to advance the SDG6 of ensuring access to clean water for everyone.

- Water source points should be adequately protected & ad hoc water quality testing & quality control mechanisms need to be in place to ensure safety of rural water supply.
- Promoting household water treatment practices (only 8% of the surveyed households practice water treatment irregularly).
- Providing safer & convenient storage containers/promoting how to clean jerrycan properly would avoid substantial risk of water contamination.
- Building the capacity of WUA is critical in the provision of sustainable rural water supply.

Reference: WHO/UNICEF (2015): Progress on drinking Water and sanitation: 2014 update and MDG assessment. New York, NY, USA, United Nations Children's Fund; Geneva, Switzerland (UNICEF), World Health Organization (WHO).

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