



Millennium Water Alliance

# Prioritization of Water Quality Indicators: The Millennium Water Alliance Experience In Ethiopia

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## BACKGROUND

MWA has worked to improve WASH access and local capacity in Ethiopia since 2004. With support from the Conrad N. Hilton Foundation and others, MWA has assisted over 1.1 million people as well as a large number of schools and health facilities, across five regions. In the previous phase of the program (from 2011 to 2014) upon which this research is based, local partners and five international NGOs were implementing: CARE, Catholic Relief Services, Living Water International, WaterAid, and World Vision.

## THE PROBLEM RELATED TO WATER QUALITY INDICATORS

For water schemes serving rural communities that are often small and in remote locations of developing countries, rarely, if ever, is testing done for all parameters proposed in W.H.O. guidelines or national standards. **In the case of Ethiopia, the government has set water quality standards for 47 parameters, consistent with W.H.O. guidelines.** These include bacteriological indicators, toxic or disease causing contaminants, physical characteristics, parameters that affect palatability, and pesticides that are toxic or cause disease. It is questionable whether the equipment exists in Ethiopia to test for some of these parameters.

Category of Parameter	Number of Parameters in GOE Standard
Fecal coliforms (E. Coli)	1
Physical characteristics	4
Parameters that affect palatability	18
Toxic or disease-causing contaminants	13
Pesticides that are toxic or disease-causing	11

Even if the equipment were to be brought to Ethiopia to test for all 47 parameters in the GOE standard, doing such testing in small rural communities would take funding and staff time away from the construction and/or rehabilitation of water schemes benefiting other communities, and this would be a trade-off of dubious value.

## THE SOLUTION:

In early 2013 MWA developed a Water Quality Monitoring and Testing Protocol for use in Ethiopia, which prioritizes a limited number of parameters. This protocol does not provide guidance for the testing of any other parameters.

Parameter	W.H.O. Guidelines (4 <sup>th</sup> ed.)	Govt. of Ethiopia Standards (applicable to MWA in Ethiopia)
Fecal coliforms (E. coli)	0 (zero) CFU/100 ml	Number of E.coli per 100 ml must not be detectable
Fluoride	<1.5 mg/l	<1.5 mg/l
Nitrate as NO <sub>3</sub>	<50 mg/l	<50 mg/l
Arsenic	<0.01 mg/l (<10µg/l)	<0.01 mg/l (<10µg/l)

## RESULTS OF APPLYING THE WATER QUALITY PROTOCOL IN THE FIELD

- 63% of the 308 water schemes that were tested for E. coli met the standard of zero E. coli/100 ml. Another 11% came very close to meeting the standard, with less than 10 E. coli/100 ml.
- Most of the schemes that did not meet the standard were hand-dug shallow wells equipped with handpumps. MWA is now investigating why a large number of hand-dug shallow wells did not meet the standard.

Almost all water schemes tested met the standards set for fluoride and nitrates (below), but there is no data for arsenic. Implementing partners were not convinced of the importance of testing for arsenic because prior experience indicates that it is extremely unlikely that there will be unacceptable concentrations of it.

## % OF WATER SYSTEMS TESTED THAT MEET STANDARDS FOR FLUORIDES, NITRATE AND ARSENIC

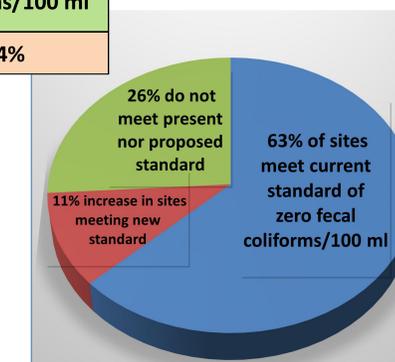
	FLUORIDES	Nitrate as NO <sub>3</sub>	ARSENIC
NUMBER OF SYSTEMS TESTED	% of water systems meeting standard of <1.5 mg/l	% of water systems meeting standard of <50 mg/l	% of water systems meeting standard of <0.01 mg/l
313	99%	97%	no data

## POTENTIAL CHANGES

The Water Working Group of the WHO Joint Monitoring Programme has recommended the creation of a new category of “intermediate” or “basic” water quality, beginning sometime in 2015. According to this Working Group: “full conformity with WHO guidelines (of zero E.coli/100ml) is unrealistic and a target based on a low level of risk i.e. <10 CFU E.coli/100ml is more achievable. Furthermore it is possible to measure a level of <10 E.coli without membrane filtration which makes it much easier and cheaper and therefore more measurable.”

## POTENTIAL IMPACT OF PROPOSED NEW W.H.O. GUIDELINE THAT WOULD ALLOW A MAXIMUM OF 10 FECAL COLIFORMS/100 ML, FOR “INTERMEDIATE” OR “BASIC” WATER QUALITY

NUMBER OF SYSTEMS TESTED	% of water systems meeting standard of zero fecal coliforms/100 ml	% of water systems meeting PROPOSED standard of less than 10 fecal coliforms/100 ml
308	63%	74%



## LESSONS LEARNED

- Achieving microbiologically safe water remains a challenge, and until this is achieved for a very high percentage of water schemes, it should be the primary focus of efforts to improve water quality.
- Setting a few priority water quality indicators is practical for water schemes serving small rural communities. It is a step forward from the common practice of only testing for fecal coliforms, and at the same time it is more realistic than requiring that a long list of indicators be tested for.
- Testing for arsenic is more difficult than testing for the other priority indicators. Implementing organizations cannot be expected to undertake such testing unless they are convinced that arsenic is a significant problem in the region where they are working.