Planning for Water Quality Monitoring

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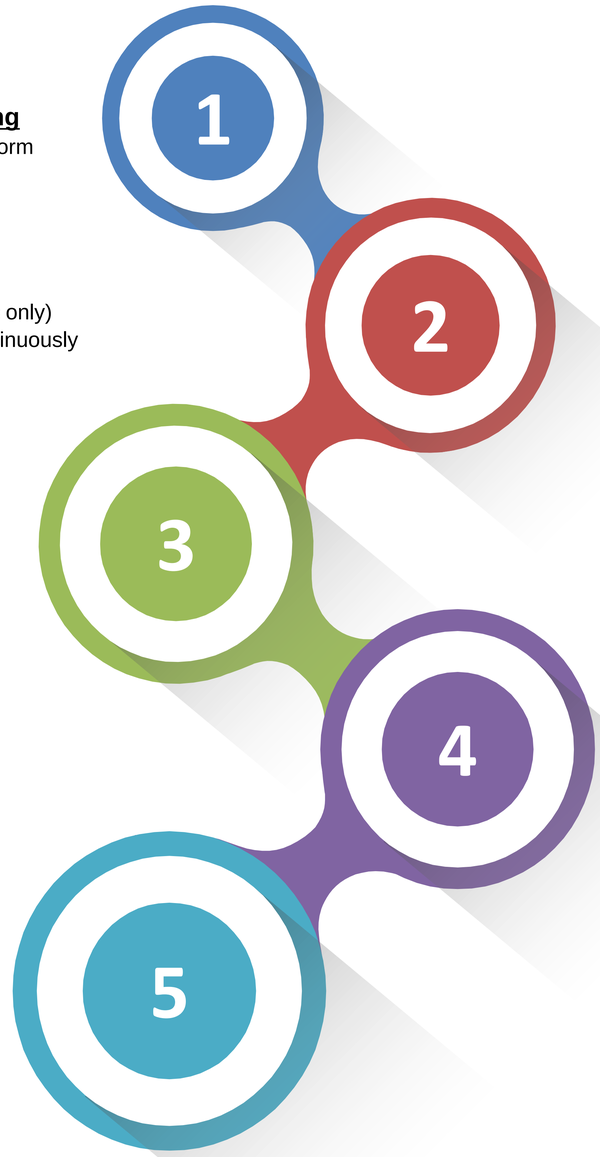
Background

As part of Living Water's quality standards, each country office is required to develop a water quality monitoring plan. The ongoing monitoring helps ensure that water services provide safe water to communities which potentially contribute to reduced diarrheal diseases. In 2014, Program Excellence worked with the Kenya office to test a planning process and tools that would identify the most convenient, cost-effective method for performing accurate water quality monitoring.

Step 1: Establish Water Testing Parameters

Kenya Initial Validation Testing	Monitoring	Kenya Verification Testing
E. Coli or Thermotolerant Coliform	Color	E. Coli or Thermotolerant Coliform
Turbidity, pH	Odor	Turbidity, pH
Nitrate / Nitrite	Turbidity	Nitrate / Nitrite
Iron, Hardness	Taste	Iron, Hardness
Total Dissolved Solids		Total Dissolved Solids
Taste, Color, Odor		Taste, Color, Odor
Fluoride (groundwater sources only)		Fluoride (groundwater sources only)
Alkalinity, Calcium, Magnesium		Free chlorine residual (for continuously chlorinated systems)
Sodium, Manganese		
Free chlorine residual (for continuously chlorinated systems)		



Step 2: Map & Estimate Number of Tests

The closest certified labs are located and the time it will take to transport samples from the most remote communities is documented. This is summarized for the Kisumu East geographical area. Estimated Initial Validation test **Each water source must undergo 1 validation test panel.**

Type of water point	Routine Verification Tests	# Tests/Yr
Borehole, Confined Aquifer	Annually	1
Borehole, Unconfined Aquifer	Twice Yearly (wet/dry seasons)	2
Improved Dug Well	Twice Yearly (wet/dry seasons)	2
Spring	Twice Yearly (wet/dry seasons)	2
Rainwater Collection System	Twice Yearly (wet/dry seasons)	2
Piped Water Supply <5000 ppl	Monthly (at distal point)	12

Adapted from WHO

Step 3: Identify Testing Options

Once the number of tests are identified, testing options can be evaluated and analyzed. These are in two categories: using a certified national/local lab and establishing a LWI portable water testing lab.

(a) **Certified lab:** Identify 2 or 3 labs and examine their ability to test necessary parameters, certification status, costs, reliability, location, staffing, and turn-around time. In Kenya's case the best certified lab option was the Water Resources Management Authority (WRMA) government lab in Kisumu and this was selected for consideration.

(b) **LWI portable lab:** Identify 2 or 3 test kits and examine the kit's capacity to test necessary parameters, costs, company reputation and service, any local accreditation requirements, staffing. In Kenya's case they already had a qualified water technician on staff and they also discovered that a LWI lab could be nationally certified through the Kenya Accreditation Service (KENAS). Knowing this, they selected the Del Agua No. 2 portable testing lab for consideration.

Step 4: Analyze Testing Options

Production Year		Cost of Certified Lab Tests*	Costs of water tests w/ LWI portable lab*
2014	yr 1	$3,745	$1,047
2015	yr 2	$4,493	$1,257
2016	yr 3	$5,392	$1,508
2017	yr 4	$6,470	$1,810
2018	yr 5	$7,765	$2,172
	Total	$27,865	$7,795
Capital cost of LWI test lab			$7,492
Training and certification			$2,400
Grand Total		**$27,865**	**$17,687**
Expected Savings in 5 years with LWI Portable Lab			($10,178)
*Assuming annual production growth of 20%			Over 36% savings

Step 5: Finalize the Plan

After analysis of capacity and costs, the Routine Water Quality Monitoring Plan is finalized utilizing a report template which provides the rationale for each step in the process and a budget and implementation plan. In view of its qualified staff for implementing a testing lab that meets government standards and the cost efficiency, the Kenya team chose to budget for a new capital expenditure, the Del Agua No. 2 portable water testing lab in 2015.

Conclusions

- There is limited data available for NGOs that describe a method to determine the most efficient way to monitor water quality.
- For the Kenya team, going through this process helped them discover available local resources.
- This process can aid other country program operations in adopting a complete water testing solution that is within their budget and follows WHO guidelines.
- Monitoring water quality on a regular basis helps ensure communities maintain safe water.

References

WHO 2011. *Guidelines for drinking-water quality, Fourth Edition*. Geneva, Switzerland: World Health Organization.
WHO Undated. *Fact Sheet 2.29: Water quality monitoring*. Geneva, Switzerland: World Health Organization.