

Determinants of Household Water Quality in a Peri-urban Area in Kisumu, Kenya:

Implications for Market-based Approaches



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Background- Kisumu WASH

- 40% households connected to KIWASCO tap water¹
- 10% households connected to city sewer system²
- Only 7% of poorest residents in Kisumu have access to a tap within compound³
- City's peri-urban households use water from taps and contaminated wells through water vendors⁴
- 60% of residents live in per-urban communities⁵
- Cholera outbreaks in Kisumu June 2008- present⁶

1 Kisumu City Development Strategy, 2004-2009

2 Kisumu City Development Strategy, 2004-2005

3 Citizens Report Card, 2007

4 UNHABITAT, 2005

5 UNHABITAT, 2005

6 Relief web, 2008 and 2009

Key Questions-

- In peri-urban areas, what are the key factors and behaviors affecting safe water?
- How do households respond to market based solution? And how does this affect their water quality?
- How are the poorest households differentially affected?
- Need to consider how to ensure SAFE water in the context of market based solutions

Methods- Household Survey

- Survey 1000 households in Obunga community- Obunga, Kamakowa and Nyawita in February 2009
- Questionnaire- open-ended questions on household demographics, assets, water sources used, and water source treatment and storage behaviors
- GPS coordinates collected for tracking/analysis
- Data collected on PDAs



Kiosks and Municipal Water



Kiosks and Municipal Water

- Over 90% state it is their main drinking source
- Tested taps were free of fecal contamination
- Most taps had > 0.2 mg Cl / liter
 - Enough for protect at that point, but not extended residual protection
- Often transported in open or multi-use containers
- In stored water samples
 - Over 35% had E. coli contamination
 - 25% had adequate residual chlorine
- Households who also treated at the point of use or used a narrow mouthed container were less likely to have contamination

Shallow Wells



Shallow Wells

- Small fraction of users rely on them as a primary drinking water source
 - Many use it occasionally or for other uses
 - Users are more likely to treat it
- Pot chlorination
- Shallow well users are 2.5 times as likely to have fecal contamination of their drinking water
- User impression of safety made some people switch to shallow wells

Vendors



Vendors



Vendors

- Less than 10% of users rely on vendors
- Most users assume water quality is quite high
- Actual quality depends on the source:
Approximately 50% of users of vendor water had fecal contamination
- The expectation of safety may make some users less likely to treat it at the household

Results- Odds Ratio of *E.coli*

	Odds Ratio	Confidence Interval
<i>Sources ever used for drinking water</i>		
Report ever using a tap	0.22	0.09- 0.52
Report ever using a well	2.79	1.32-5.89
Report ever using a water vendor	0.79	0.54-1.18
Report ever using rainwater	1.31	0.99-1.74
Report ever using a “other” source	0.56	0.19-1.67

Reaching the Poor

- Poorest 20% of households were 70% more likely to have E. coli contamination
- More likely to use wells
 - More likely to switch to cheaper sources that are perceived to be clean
- Less likely to treat their water
 - Not just because of cost

Implications for Market-based Solutions

- Need to consider to implications for final drinking water quality
 - Almost all households' water was chlorinated at least once, but 75% had insufficient residual chlorine
 - Contamination after delivery
 - Users making poor judgments about what is really safe
 - If users make decisions based on perceive quality or other attributes, how do we ensure actual quality?
- How will the product or service make it down to households who need it the most?
 - Will they use it the same way and will it remain safe?