Effective WASH: A Results-Driven Approach to Reliability and Hygiene

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Objective

Whave's **Safe Water Security** program aims to identify and address the root causes of water-borne disease in areas where sharing of point sources by 20-100 families, walking more than 100m from their homes, is the norm.

Introduction

The program operates in rural Uganda. Water service levels are classified as "basic" (walks are between 100m and 1km and consumption is under 20 litres per day per person, implying a "high health concern") or as "no access" (collection times of over 30mins and consumption volumes insufficient for health) (WHO 2003). Combined, these service levels apply to 84% of sub-Saharan Africa and 42% of the world population (Fig 1, JMP 2015). A high health concern remains significant, even for the improved sources included within these figures, due to low consumption volumes, distances walked, and contamination after construction. The Whave **Safe Water Security** program researches the causes of this on-going health concern and takes action to solve the problem. The findings, analyses, and solutions are relevant principally to point sources, since these predominate in the foreseeable future. Replacement of point sources with piped supply to users' homes or nearby is clearly a priority, however, in practice, rural piped supply faces many of the same effectiveness issues and the solutions listed here are thus relevant to both types of supply.

The Issues Addressed

Working in the field since 2013, Whave identified the following drivers of water-borne disease:

Home contamination: Even where clean water is drawn from an improved source, it is commonly contaminated during transport, storage and usage, with **un-hygienic behaviour** undermining investments in clean water sources. Hygiene campaigns typically do not show sustained results and are often followed by **relapse**.

"Efforts... to provide reliable sources of drinking water are jeopardised by poor handling and storage practices." *Opio, 2012*

Poor reliability: Improved water sources, notably hand-pumps, typically experience frequent breakdowns and long periods of "downtime". Repairs are often overly expensive due to lack of servicing, with the result that many improved sources are abandoned. Users are forced to revert to traditional sources (e.g. contaminated open ponds) or walk long distances during downtime periods.

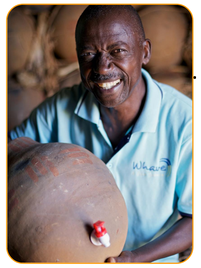
"Even a few days of interrupted supply of drinking water may be sufficient to destroy the health benefit from the provision of clean drinking water."
Hunter et al, 2009

Other root causes are **source contamination** (groundwater drawn from point sources frequently suffers from *E.coli* contamination) and **insufficient regulation.**

Methods

Home Contamination:

Method 1: Continuous "hygiene reminder visits" encourage behaviour change and prevent relapse after campaigns. These are dual-purpose – they also track hygiene indicators, so that each community earns and receives a "**community hygiene grade**". The **competitive data** generates awareness, stimulates peer-pressure, and is a basis for performance-payment of professional WASH micro-utilities, for health clubs, and for community prize-giving events. **Method 2:** Dissemination of **innovative technology solutions** through incentives mentioned above. **Method 3:** **Health clubs** integrated with performance incentives for government health extension workers to facilitate national roll-out in partnership with government. **Method 4:** **Continuous tracking of water quality in homes** (*E. coli* counts, over 450 samples taken per month). This allows the impact of the multiple interventions to be assessed continuously in line with **SDG goal 17.18/19** and facilitates national roll-out in government partnership.



A franchisee WASH micro-utility sells local drinking water pots, which are re-designed with a tap to prevent scooping. The same micro-utility is performance-paid and so carries out regular preventive maintenance.

Poor Reliability:

Method 1: a **service utility (SU)** pays local mechanics **(micro-utilities)** according to reliability (% of days each month the source is operational). The mechanics are therefore incentivised to carry out preventive maintenance and to make smart choices as to spare parts quality. This **performance-payment protocol** includes penalties for downtime. Whave is currently training new SUs (hand-pump mechanics associations are candidate trainees) and micro-utilities. The program will be operational in eight districts in 2016 to build a basis for affordable scaling. **Method 2:** promotion of "willingness-to-pay". In Uganda, a failure of many communities to pay basic water use fees (stipulated in local by-laws) has meant that funds are not available for regular maintenance visits or for immediate repairs in case of breakdowns. Poor willingness-to-pay is driven by an absence of **rural banking services**. In response to this, Whave is introducing **affordable** and **accessible** banking and savings facilities in rural areas. **Method 3:** establishment of a **components quality assurance system**, developed in collaboration with government offices, candidate trainee service utilities and linked to performance-payment of micro-utilities. The problems of sub-standard quality parts is a major challenge which is solvable through a public-private partnership between SUs and local government.

Methods

Source Contamination: **continuous testing of sources** and sharing of test data with local government. Data is used to incentivise mechanics and local water committees to carry out basic preventive measures and awareness raising. It is also used to improve technical decisions as to siting and materials, since much contamination is due to low-cost technologies unsuited to local geological conditions. Whave is trialling low cost **alternatives to shallow wells**, such as locally manufactured village water treatment plants.

Regulation and Sustainability: the introduction of **reliability assurance service contracts** in a public-private partnership framework strengthens the official Community Based Maintenance System. The CBMS is important because it assures **equal access to clean water** and avoids the pitfalls of privatisation.

Results

Home Contamination

Figure 1 shows results of community hygiene monitoring following the hygiene lift campaigns undertaken when the communities first engaged in the program. The data shows **success in preventing relapse** of hygiene levels. Significantly, this result shows that hygiene campaigns should be conducted in combination with continuous hygiene reminder visits which may double as monitoring.

Fig 1 Community Hygiene in Five Districts
2013-15 Cohorts

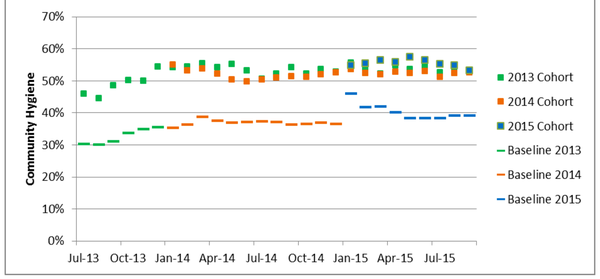


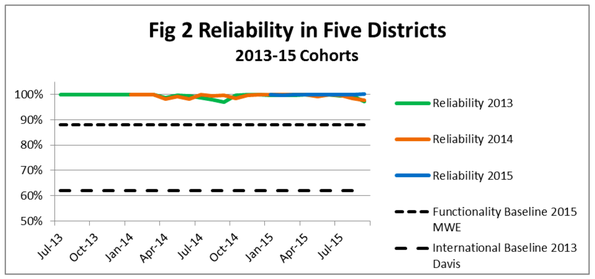
Table 1 shows **water quality test** results, revealing significant differences between areas using clay pots (Eastern Region) to store water and those using HDPE containers (Central Region). This result has prompted Whave to organize local manufacture and marketing in 2016 of clay pots modified with taps to avoid scooping, as a solution to endemic contamination in the Eastern Region.

Table 1: CENTRAL REGION	Source	Home
Number of samples Jul - Sep 2015	57	113
% passing WHO medium risk (100 cfu/100ml)	100%	100%
% passing WHO low risk (10 cfu/100ml)	98%	94%
% passing Uganda Standard (0 cfu/100ml)	79%	70%
EASTERN REGION	**Source**	**Home**
Number of samples Jul - Sep 2015	625	1,249
% passing WHO medium risk (100 cfu/100ml)	71%	27%
% passing WHO low risk (10 cfu/100ml)	29%	9%
% passing Uganda Standard (0 cfu/100ml)	9%	4%

Reliability

Figure 2 shows that the performance-payment system between SUs and local mechanics has been successful in achieving **>98% reliability** in over 200 communities.

Fig 2 Reliability in Five Districts
2013-15 Cohorts



Source Contamination: The test results in Table 1 shows significant issues exist with groundwater source water quality and that continuous testing is needed to steer future interventions. The results show that alternative solutions such as village treatment plants are needed for both point sources and piped systems.

Regulation and Sustainability: Communities have adopted reliability assurance service contracts and made payments willingly. Local authorities have engaged actively in the public-private partnership in regulation and arbitration roles. The structure promises that full local cost recovery for reliability is feasible, although the task of building the capacity of local bodies to act as district-level service utilities remains to be accomplished.

Conclusions and Recommendations

Studies and field evidence show that health benefits expected from improved water sources are not being delivered . Global access figures have increased, but health concerns associated with non-piped improved sources remain unaddressed. Of the solutions trialled by the Safe Water Security program, some have already yielded positive results (**>98% reliability with performance-payment** and public-private partnership PPP). Others show promise of positive impact over forthcoming years: for example, contamination in the Eastern Region is addressed through use of **pots with taps**, relapse is prevented by continuous **community hygiene grading**, performance-payment and PPP strengthens **roll-out feasibility of health clubs**, and **low cost purification plants** and **micro-utility performance incentives** address issues of contamination of groundwater sources.

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