

Steps to Sustainability: Public-Private Partnership in WASH

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Abstract/Summary

Unreliable operation of clean water sources and inadequate hygiene and sanitation conditions are root causes of persistent water-borne disease. This paper presents a public-private partnership approach to rural WASH service delivery which addresses these issues through social, technical, financial and institutional initiatives. The approach has developed from stakeholder consultation, government partnership and extensive engagement with rural communities. A series of ‘sustainability steps’ have been developed from this practical base, which include projections of tariffs and financial viability for local service companies. Results are presented following extensive field work over three years in five districts. The conclusion is that sustainability can be demonstrated within several years, as long as the transition process starts with targeting of funding to pilot districts in which the local authorities normalise the approach by applying it universally. The pilot work would then be at sufficient scale for proof-of-concept and would establish templates and capabilities suitable for scaling nationally.

Introduction

Whave Solutions registered as a Ugandan company in 2012, after a year of preparation in which the service company concept was developed as a solution to the problems of poor functionality and hygiene. The company was established as a non-profit, in order that credible monitoring could comprise a major part of its work. The goal was to provide rural communities with affordable water supply maintenance contracts which assure reliable supply of clean water, at the same time as providing services in hygiene and sanitation which would address drinking water contamination. Since 2012, under the programme entitled ‘Sustainable WASH Services’, service agreements have been signed with more than 200 communities (Fig 1). Local technicians have been contracted as service company franchisees and trained to undertake preventive maintenance, using daily supply reliability as a performance indicator. The problem of relapse following hygiene lift campaigns has been addressed by community grading, and initiatives have been taken in sanitation. The focus has been on government and community collaboration in the design of a road map toward locally-sustained, universal water supply and sanitation, both “safely-managed” in accordance with the Sustainable Development Goals 6.1 and 6.2. This road map includes all



Figure 1: Signing of a reliability assurance service contract.

technologies for rural water supply, with priority being given to piped systems which bring water closer to homes.

The approach - Building public-private partnership frameworks

The strategy adopted by the Whave Sustainable WASH Services programme involves district governments in building institutional structures to address health problems caused by endemic water-borne disease. The programme has worked alongside district governments to test initial approaches, and practical experience gained has led to the general framework shown in Figure 2..

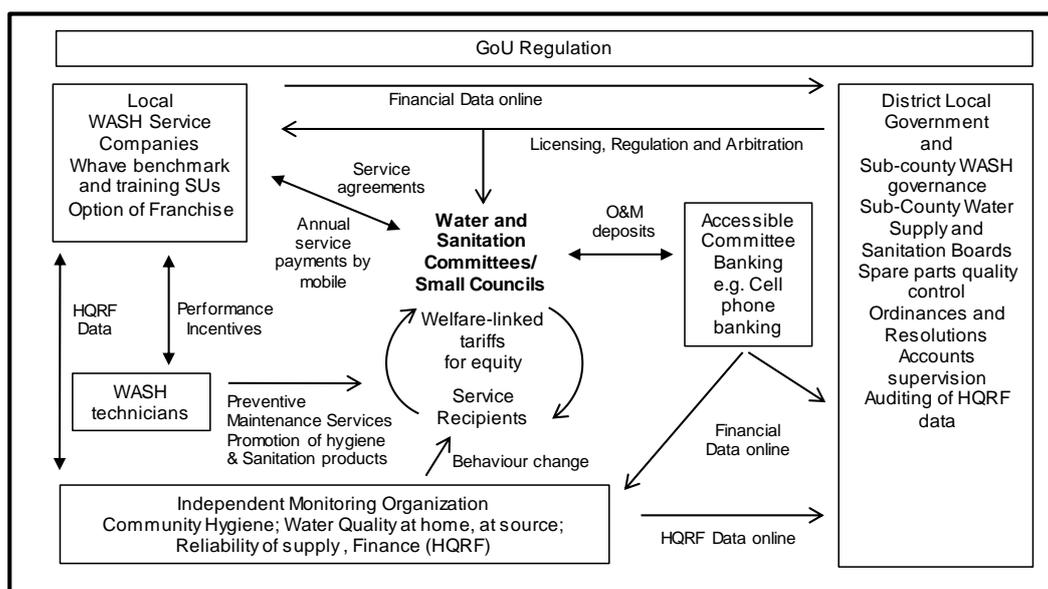


Figure 2: WASH Public-Private Partnership Structure. Some district authorities may expect Sub-County Water and Sanitation Boards to take the financial transaction and technician supervision role shown here for a service company. Stakeholder consultations however have indicated that most authorities will instead choose to regulate service companies.

As the programme evolves in forthcoming years, each engaged government is expected to develop its own variation of the public-private partnership (PPP) structure. The process can be described as a series of steps toward sustainability:

1. Reliability assurance

A common attitude in sub-Saharan Africa in respect to groundwater pumps in rural communities is “wait-till-it-breaks”. This may be as much a result of policy which loads unrealistic expectations on rural communities as it is a cultural phenomenon or an outcome of dependency on government assistance and philanthropic hand-outs. The policy of Community-based Maintenance, for example, expects rural communities to identify suitable local technicians and pay them for maintenance and repair. During several hundred community meetings conducted by Whave since 2012, the weaknesses of this approach have been reported and described. Leaders have difficulty collecting tariffs because the technical work is often sub-standard, or the technicians’ professionalism is distrusted. Interviews with technicians have revealed that they were obliged to use substandard parts because adequate and timely payments were hard to obtain from the community, while interviews with community members showed that funds collected for O&M were often misused by Water User Committee members, so reducing motivation to pay tariffs.

To address these issues, Whave has introduced a system in which the transactional relationship is conducted not between the technician and the community, but between a service company and the water committee. It then becomes the company’s responsibility to manage the quality of the technician’s work, not the community’s. The programme has investigated whether this approach reduces downtime and maintenance costs. Whave (acting as a prototype service company) offers communities reliability assurance service agreements, under which consistent water source functionality is provided in return for an annual service fee (*see Fig 1*). This represents a ‘business-for-development’ approach similar to health insurance: full payment is rewarded with full service and a smaller and incomplete payment receives less service. Revenues from service fees are used to pay local technicians, who are franchised (they carry the Whave badge when working) and performance-paid (*see Fig 2*). The franchise contracts incentivise preventive maintenance and immediacy of repair by imposing deductions on the technician’s monthly pay if a source in his concession (group of designated sources) is non-functional for more than one day. As a result, ‘down-time’ is avoided and costly major repairs are minimised.

2. Universal access and responsible communities

It is customary for community leadership committees to allow all community members access to a traditional water source, while their contributions to upkeep vary depending on wealth and consumption levels. However, modern machinery puts pressure on this approach due to the need for external technical input and specialist hardware, and the need for protection from theft, vandalism and misuse. All these pressures involve collection of cash payments from users, rather than the more traditional labour contributions. Cash payment cannot be imposed without the risk that many consumers continue to use “free” alternative sources, which are contaminated or time-consuming and dangerous to reach. Cash payments for water in trading centres in rural Uganda are typically in the order of \$5 per month per household (and often more than this), a price level which automatically excludes many families who choose instead to use contaminated sources and walk long distances.

To avoid this and secure universal access to safe water, a capable community water committee varies tariff contributions depending on what users can afford. Whave has found that rural committees in general have this capability and manage a welfare-oriented approach comfortably. While a Whave reliability assurance contract sets an annual bulk fee based on an average payment/household/month, the committee decides whether some users contribute more or less than an equal share, according to personal circumstances. An external body collecting data on varied tariffs is not found to be necessary, and in any case is unsustainably expensive. To monitor actual achievement of universal access as required by SDG 6.1/2, it is only necessary to survey villages and see if traditional universal access is being practised or not. Positive results to date imply that universal and reliable access to clean water does need a community committee as a responsible entity, and this feature of the Community Based Maintenance System (CBMS) should therefore be retained. While the implementation modality of CBMS needs radical revision, Whave and the Government of Uganda (GoU) do not promote removal of the policy altogether for this reason.

Retention of the CBMS has the implication that tariffs are set by communities, not by government. A precedent already exists for a compromise arrangement, which is that the district government passes a local law which accepts that all communities choose their tariff level, so long as it is above a specified figure. The example is Apac district, which resolved that all communities must pay between \$0.3 and \$0.6/hh/m into a maintenance fund, the rationale being that if there were few users and the community was remote and suffered high transport costs, they would choose to pay more than the minimum in order to be sure of enough funds. In this paper the mention of tariffs should therefore be taken as a reference to minimum tariffs, potentially set by district government laws. It should be kept in mind that not all community members are required to pay this average figure, given the welfare-orientated re-distribution described above.

Under CBMS, the maintenance fund belongs to the community, and is spent by the community on technical services of their own choosing. Currently, they may spend it on a service contract from a company like Whave, or on an individual technician checking a worn bearing or repairing a breakdown. However, there is scope within an improved version of CBMS for the district government to pass laws that require all communities to have in place a preventive maintenance service agreement, whether it be

with an individual service provider (the ‘ISP option’) or a service company. Local laws of this type are relevant to the question of universal access, because the poorest families living in each village are the ones suffering from prolonged repair times (they typically don’t have a bicycle to fetch water from a distant pump and they tend to revert to collection from nearby contaminated sources). The measures described here to assure reliable operation and least life cycle cost are therefore critical to the SDG 6.1 goal of universal access and “safe management” of clean water sources.

3. Professionalisation: roles, costs, tariffs

For reliable clean water supply to be assured and sustainable, costs and revenues must be balanced and stable. A key objective of the programme is to investigate how this balance can best be achieved. On the one hand, costs must be well understood, while on the other hand an effective strategy for apportioning finance between user tariffs and government funds must be devised. One premise is that foreign aid has a role to play in early stages, but ultimately will not be a revenue source. A first stage has been the introduction of service companies and reliability assurance agreements in a PPP framework, as described above.

Costs divide broadly into the four categories of capital expenditure, minor operation/maintenance, major parts replacements and rehabilitations, and support (administrative, regulatory, management). Under current CBMS conditions, the roles of the main entities within the PPP framework divide as follows: (a) government and foreign development partners provide capital expenditure (fresh installations and full rehabilitation) and resources for correction of structural faults, for example silting and collapsed liners; (bi) local technicians collect tariff revenue from communities and use it to undertake skilled maintenance tasks and procurement/replacement of minor parts; (bii) major parts (for example pipes and rods) are replaced by government and foreign aid partners; (c) operational tasks are paid for, managed and conducted by the users, such as protection from misuse, vandalism and theft; (d) administrative, managerial, regulatory and compliance support is provided by local government.

Under the service company approach and the evolving radical revision of CBMS, known locally as ‘Improved’ CBMS (ICBMS), some of the tasks listed above are taken up by service companies. The financial transaction component of task (bii), for example, is undertaken by the service company. While technicians continue to undertake the technical work, they are supported in this role by the service company which has better engineering and hardware procurement capability. The service company also provides management and control of the quality of the technical work. Task (d) divides between local government and the service company, with local government focusing on regulation and the service company focusing on the management and administration for task (bii), as described above. The regulation role of the government includes support to tariff payment compliance and enforcement of relevant regulations, as well as arbitration and licensing of the service company. It also involves the monitoring service company performance, and further supportive activities, such as monitoring of water quality at the supply sources (stand-taps, supply tanks, hand-pumps, and shared treatment plant outlets).

The costs met by a service company are therefore not restricted to technical maintenance. Management is needed to ensure the quality of the work of local technicians and of collection of tariffs. Administrative costs are also associated with tariff collection. This “software cost” is likely to be around 60% of total service cost. This imposes an economy of scale, since management and administration costs are relatively fixed compared to technical costs which are typically proportional to numbers of sources maintained. A general consensus has arisen through community and government stakeholder meetings that a tariff of \$0.5/household/month is acceptable to communities and stakeholders. A cost study is under way which so far indicates that service cost can be targeted at this level, so long as local government capacity to perform regulation tasks is in place and effective. The programme aim is to see if this target can be achieved alongside the necessary local government capacity. Evidence to date on operational and administrative costs indicates that with tariffs set at this figure and successfully collected, a district-licensed service company will need to engage with a minimum of 400 communities in order to breakeven. A larger customer base will help to attain the target and introduce some margin. To put this figure in context, the average number of rural point-sources (not including protected springs) per district in Uganda is 715 (there are currently 112 districts in all). If full access to improved point-sources is achieved

by all communities, the average increases to 1,084. Consequently, the tariff target of \$0.5/hh/m is more likely to be achieved in practice if and when a service company achieves a larger customer base, ideally up to 1,000 communities.

However, this breakeven calculation assumes that the cost of major parts replacement (bii) continues to be met by government or with foreign aid, along with monitoring of source water quality at each source. Whave currently monitors water quality at sources and has found the cost of doing this adds 7% to the service cost.

One question posed by the investigation is: will a local service company have sufficient credibility to win the confidence of the communities when it comes to tariff payment? One solution may be that the local service company is a franchise business carrying the badge of a national or regional body. Although this approach may not turn out to be necessary, or may be useful only as a preliminary step, the priority of the programme is to build capability of local service companies to the point where they are directly trusted by communities. Failing this, franchising is likely to add 10% to the cost of providing service.

One of the key programme findings is that the current division of roles bi and bii is a cause of the “wait-till-it-breaks” syndrome. It cultivates a tendency to treat a pump as belonging to the organisation that installed it, and for routine maintenance to be ignored – why replace parts at your own cost, when government or an NGO is ready to replace a major component? An interesting finding has been that the inclusion of major components in a “full cover” maintenance contract adds only 20% to cost, under preventive maintenance conditions which avoid premature failure. If the tariff target is maintained at \$0.5, then the breakeven is no longer 400 sources but 600 sources. A larger customer base than this is of course preferable, and a service company will target regular tariff income from a whole district,. The customer bases must be geographically concentrated to minimise transport costs and also to match licensing from individual sub-district governments (“sub-counties” in the case of Uganda). These findings have prompted the programme to prepare for a second stage in the sustainability process, in which the role bii is met by a service company rather than government/foreign aid organisations.

The problem of premature technical failure, unwillingness-to-pay and prolonged downtime, is not only the outcome of ineffective maintenance systems, but also of serious weaknesses in quality control of installations. Capital expenditure is poorly managed, with the result that most rural water sources suffer from sub-standard parts and materials, and many also from poor siting and design. The programme undertakes several measures to address this; for example by helping sub-county and district councils to establish quality-controlled depots and pass council resolutions which oblige technicians to use only approved parts. It also promotes change in the tendering process so that durability is not sacrificed to price. In the long run, a third stage in the financial sustainability path may become necessary as a further method of addressing this issue. This is the extension of the service company role into a “build-and-operate” modality, under which rehabilitation and construction is undertaken by the same company that provides service contracts. With appropriate license agreements in place for service companies, and appropriate performance monitoring protocols enforced, this approach will create an incentive for improved design and construction optimising life-cycle-cost and promoting least-cost tariffs.

In the short term, the problem of poor installation quality is an impediment to progress toward reliable rural water supply. The cost and revenue estimates set out above assume that the water source technologies are in reasonably good shape at the point at which reliability assurance service agreements are signed; only then does it make sense to “insure” the sources at the target tariff level. The Whave programme therefore assumes that capital is available for refurbishment and upgrading. This highlights the importance of foreign aid assistance which has a critical role of upgrading installation quality and design. The programme promotes an approach whereby rehabilitations assisted by foreign organisations are combined with community preparation for preventive maintenance service contracts, as well as by preparation of the district and sub-county government offices for stocking of spare parts and appropriate regulation capacity. This will mean that once the maintenance system is built properly at district scale, further rehabilitation expenditure will not be needed. The GoU is taking the Whave programme seriously because it promises to relieve the large sums devoted to rehabilitation each year; these sums may now be

now earmarked as funds for support to the PPP framework for preventive maintenance and continuous renewal of major parts by the communities themselves.

Cost analyses which is cautious as to the practical feasibility of establishing all the measures mentioned conclude that the indicative tariff level needs to be approximately \$1/hh/month (Harvey 2015, Biteete 2013). This level would allow service companies to interact much more with communities, so increasing tariff compliance. Because this \$1 tariff level is so much less than the \$5/month commonly paid by rural families at trading centres for filling of jerry-cans, and is less than 2% of average rural household income in Uganda (\$73.1) it could be acceptable to communities (UNHS, 2010)., However, outcomes from meetings for local politicians and community meetings in which the feasibility of this higher tariff has been debated extensively, suggest that the \$0.5 tariff is already ambitious from a political acceptance point of view and it is the only realistic target currently. Nevertheless, as the supporting environment is developed, this figure could be revised Service companies may not be viable at this lower level of revenue, and a rebate from tax-payer sources matching community payments and based on monitored performance could be a necessary.

Whave’s monitoring protocols prepare for implementation of this results-based subsidy option. To begin with this option is avoided and the emphasis is on service companies operating on the basis of tariff revenue, and tax-payer funds meeting only government support costs (also as far as possible using results-based rebate approaches). There is however the possibility that government support effectiveness will be limited and funds could be more effectively spent on results-based rebates for service companies. The programme is open to these options evolving with different solutions in different districts and even different sub-counties, since this approach aligns with GoU decentralisation policies and ensures that regulation has a high level of “ownership” and “buy-in” at local level. Currently GoU has recommended that tax-payer funds are channelled to sub-counties as well as districts. It has also recommended establishment of sub-county water and sanitation boards, and has encouraged local technicians to form associations which are permitted to take on rehabilitation contracts. These are all strong moves towards local discretion in regulation modalities.

4. Measures promoting willingness-to-pay

The rural tariff of \$0.5/household/month is politically acceptable and much less than the \$5 typically paid at stand-taps, yet there is still insufficient willingness-to-pay this amount within communities. The Whave programme is implementing several measures to improve the situation, integrating these with development of local government regulation capacity. Some examples are: (a) radio call-in discussions debating tariffs and their purposes which involve civil society, farmers, politicians, and civil servants; (b)

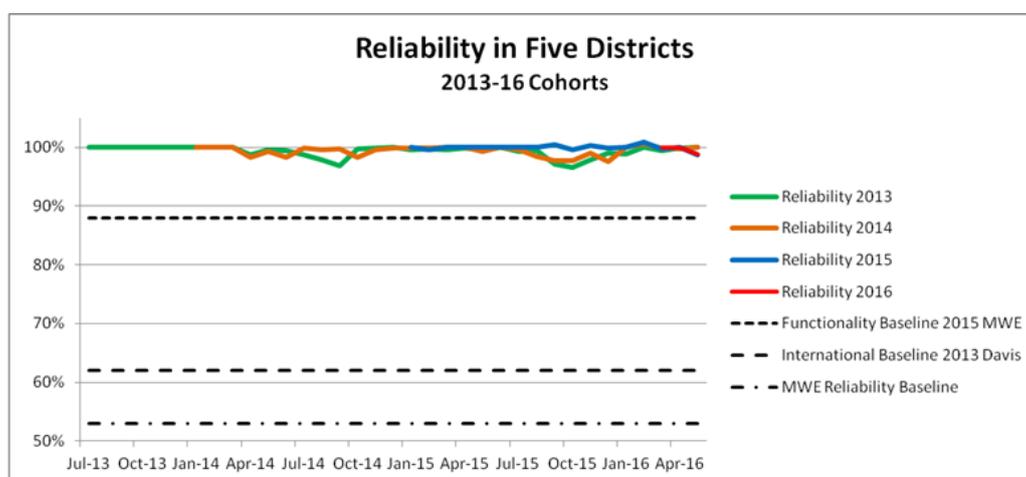


Figure 3: Reliability in five districts – 2013-16 cohorts

introduction of telephone banking for community water committees, and (c) promotion of council resolutions. The latter might, for example (i) make committee bank accounts containing maintenance deposits obligatory, in order to reduce costs of transactions and to improve accountability; (ii) certify technicians and oblige them to use only approved hardware; (iii) oblige committees to have active preventative maintenance service agreements from approved and licensed technicians; (iv) prohibit or discourage expenditure on rehabilitation from external sources such as local government or voluntary agents, in cases where preventive maintenance activity has not been demonstrated for a period of time, and (v) institute independent performance monitoring agents and protocols which act as a basis for licensing of preventative maintenance service providers.

The current lack of willingness-to-pay is attributed by most observers to a lack of accountability. Almost all communities have stories of maintenance funds being borrowed by committee members and not returned. Communities also frequently mention technicians doing sub-standard work or over-charging. Families are not likely to pay for preventive maintenance unless the payee is fully trusted. Whave has overcome the technician problem by controlling the quality of their work. However, trust in local service companies (and individual service providers) may prove to be a problem. The introduction of phone banking potentially offers a solution and so may be a key to building willingness-to-pay. Telephone transfers and online bank accounts can be tracked and supervised. The community committees’, the technicians’ and the service companies’ bank accounts can all be visible to each other and to local government regulators and arbitrators, also to an independent monitoring body. Payments can be made and receipted without cash being handled, so saving travel expenses and maintaining transparency. Spare parts quality control is more easily managed as expenditure from bank accounts can be conditional on approval, ensuring that the approved parts are purchased at approved prices. Whave has signed a collaboration agreement with Post Bank under which it facilitates sub-county registrations of committees and their opening of telephone banking accounts.

5: Continuous and independent monitoring

The results presented below (*see Fig 3*) demonstrate that certain monitoring indicators are effective, and their application is affordable; their introduction is a key sustainability step. The purpose of a new performance indicator for “reliability”, innovated by Whave, has been described above. This has provided a basis for performance-payment of technicians, as well as offering a basis for licensing of service providers (companies or individuals). The reliability indicator measures the portion of time lost in prolonged repair down-times by “partially functional” sources. For example, a water source that is operational for 15 days through a month containing 30 days has reliability score that month of 50%.

Testing of source water quality is also recommended as a permanent part of the WASH PPP structure. This is necessary to determine which technologies and designs are effective in providing clean water, as well as to steer corrective action. Source quality monitoring results are shown in *Fig 4*.

Monitoring has important potential for achievement of SDG 6.2. Clean water supply by itself does not solve the water-borne disease problem unless it is supplied in adequate quantity or very near homes, prompting hygienic handling. In the case of the majority of families in sub-Saharan Africa who are unlikely to have piped supply for many years, hygienic handling of water is critical if the intended health and productivity benefits of an improved source are to be obtained. The programme has introduced two indicators for hygiene and sanitation: home drinking water faecal contamination and community hygiene grades. It may take some years for hygiene and sanitation conditions to be transformed entirely, or for piped supply to replace hand-pumps, after which time these indicators may no longer be needed. However, until that time they are necessary as permanent elements in the PPP structure and their monitoring should be continuous and institutionalised.

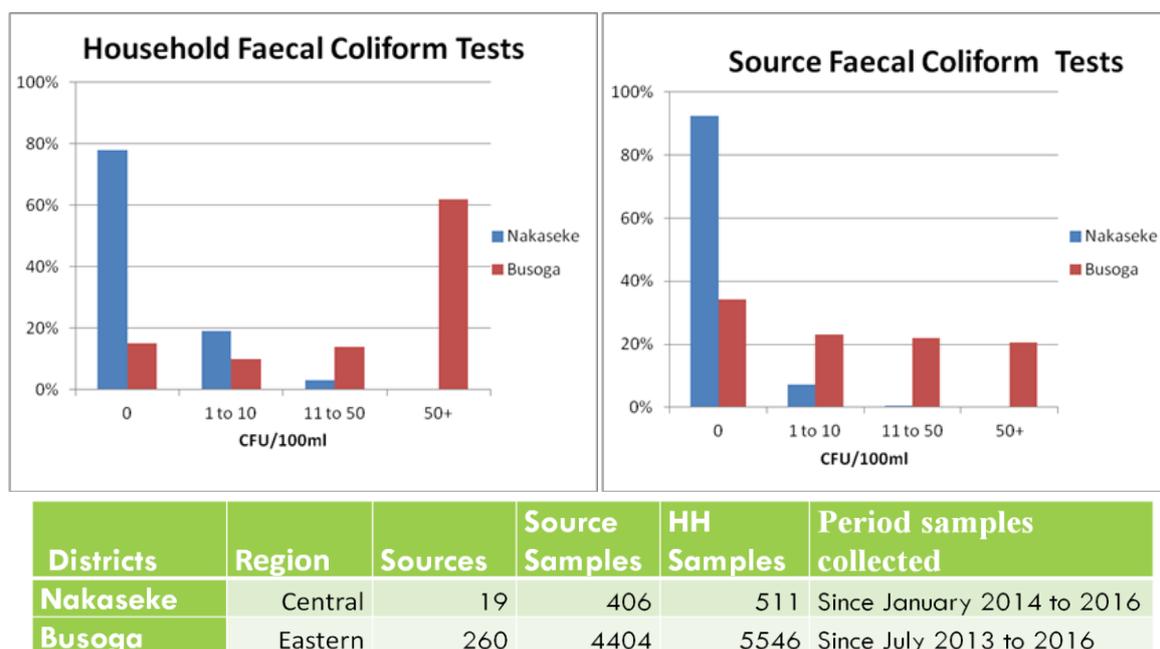


Figure 4: Faecal coliform tests in five districts comparing regions.

The home drinking water quality indicator has proven effective during the past three years. It has revealed serious issues with current professional practice. Latrines are mandatory, but little thought or action has gone to cleansing methods, encouraging contamination of household stored drinking water, as shown in Fig 4. Whave has consulted rural families about their traditional hygiene methods and is encouraging a return to abandoned cleansing methods, which have been dropped in pursuit of modernity.

In regions where scooping from storage pots with cups is practised, only 25% of households meet the WHO low risk threshold for drinking water quality (<10cfu/100ml), compared to 97% of households in non-cup-scooping regions. Finger-dipping when removing water from the pots with cups has been observed during hygiene grading surveys as a common occurrence. This result has led to Whave editing professional outreach manuals (which illustrate cup-scooping) and encouraging a return to ladles. In addition, Whave is training local potters to make and sell a modified pot which has a tap and a narrow neck, preventing cup-scooping. The pot has proved inexpensive and affordable, and is purchased at full cost.

The community hygiene grade indicator has also generated significant results. Homes are randomly selected on random dates each month, and surveyors are trained to record observations, rather than replies to questions. A full range of hygiene behaviours are surveyed, so that the data collected works to identify where interventions are needed. Expensive investments in hygiene lift campaigns are invalidated by the prevalence of ‘relapse’ – new behaviours fade and old habits are reinstated. The 2010 Cochrane Review reported interventions “waning over the long term” (Gould et al, 2010; Pfoh et al, 2013), and an IRC (2004) study showed hand-washing skills in Uganda decreased significantly within one year following uplift. Results from three years of hygiene monitoring are shown in Fig 5 for over 200 communities. Instead of relapse, these records show retention of hygiene up-lift. Regular monitoring acts as a reminder visit to a community: it sustains improvements as no family wishes to be caught out. The programme is planning a competitive league table, encouraging pride in better hygiene and using competitive events and radio exposure to foster improved hygiene levels.

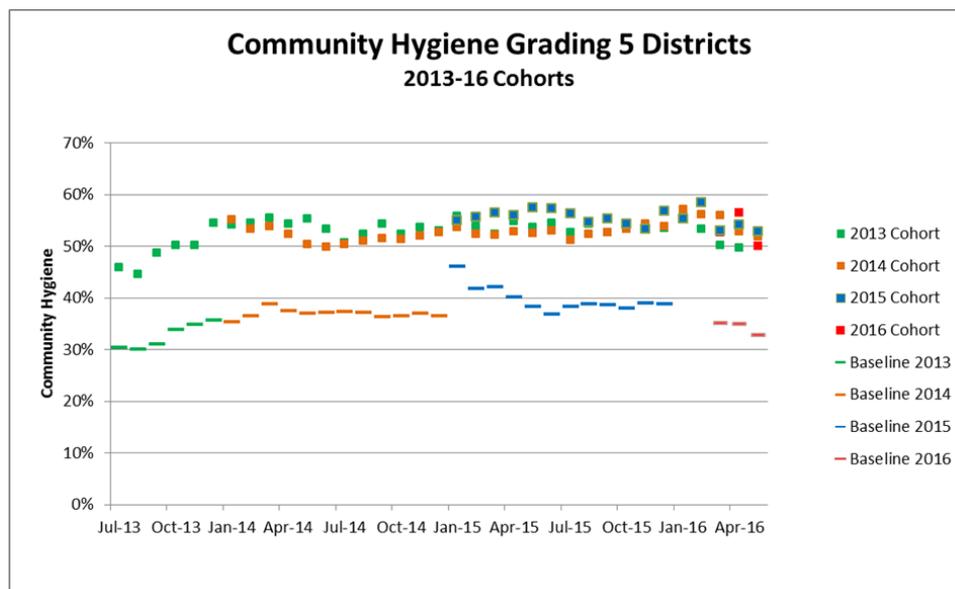


Figure 5: Community hygiene grades in five districts – 2013-2016 cohorts.

Results and Lessons Learned

Fig 3 shows reliability baselines and results over a period of years following annual cohorts of communities signing into reliability assurance agreements. The separation into cohorts reveals whether or not reliability drops over time, which may be expected since a reliability assurance agreement is usually started with refurbishment of the source, so few problems would be expected in the first year. In comparison to baselines estimated at 50-60% (Davis, 2013) and conversations with GoU engineers, reliability of water sources in more than 200 communities has remained above 99% over three years. The lesson learned here is that performance payment of technicians is effective – it achieves reliability. This result also confirms the ideal that rehabilitations will eventually not be needed, but water sources will be kept running indefinitely without excessive appeals for foreign aid or strain on the GoU rehabilitation budget.

Fig 4 shows that home contamination is a far more serious issue than is commonly acknowledged. These results should act as a trigger for investment in improved health outreach protocols to balance investments made in improved and more reliable water supply. Equally, the data shown for source quality is a cry for action. In this case, GoU has become aware of the situation and is taking measures, for example deciding that government will no longer fund hand-dug or shallow wells. However, NGOs continue to install similar ground water facilities and there may be insufficient awareness of water quality. Whave is developing low cost water treatment plants in response to this issue.

Fig 5 shows that hygiene levels rose by an average of 16% as a result of initial campaigns at time of service contract signing, and this gain has been sustained over three years, without relapse and without any intervention other than regular monitoring. Again, the information is separated into cohorts, so the tendency for “older” communities to relapse, can be inspected.

The lesson learned in respect to the monitoring work is clear – regular and continuous monitoring is essential if water-borne disease is to be eliminated. Data collected allows interventions to be targeted and erroneous investments and measures to be revealed. The process of tracking also drives and sustains desired behaviour change.

To establish sustainability in one pilot district will not be a fast process and it is estimated that the multiple measures described above will take four years to implement with sufficient funds available. During this period, officials from other districts would be involved, and professional capability for

replication would be developed alongside template contracts – a national scaling programme would then be feasible in subsequent years.

Are water users content with reliability assurance agreements? This question will be answered through public debate in forthcoming years. The planned radio talk-shows will provide feedback and evolving community willingness-to-pay will be the principle test. Currently, the programme engages 150 communities graduating probation stages to full annual service agreements and paying their annual subscriptions. Most of these communities include individuals who resist payment (often quoting politicians who have claimed votes by promoting “free” water) and some committees struggle to pay the annual bill in the face of the resistance. The programme therefore aims to normalise payment and secure quality of service, through geographically concentrated expansion of scale throughout a whole district, and through introduction of all of the measures described above. The lesson learned is that consumer willingness-to-pay is a participatory process that has started but will not yield positive results unless the multiplicity of steps described here are implemented at appropriate scale, which is estimated as a minimum of 600 neighbouring communities.

Conclusions and Recommendations

A full suite of measures are needed to establish reliable rural water supply and transform hygiene conditions, in order to address water-borne disease sustainably. These measures can be summarised as a series of sustainability steps, including establishment of regular monitoring of key indicators, performance payment of local technicians, and new initiatives in hygiene and sanitation. The measures will be effective if introduced through public-private partnerships in pilot districts where economy of scale is achieved (engagement of more than 600 neighbouring communities) and where the district government introduces the appropriate support measures including support to tariff payment compliance. This process will need considerable funding, but will result in achievement of a proof-of-concept for sustainability and the prospect of national roll-out and international example.

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