

Rural Water in Uganda

The three key questions: who, what, how?

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National economic development is generally linked to rural development. Poverty in rural areas has been a feature historically in most countries which now enjoy high general standards of living. In these countries, poverty was alleviated through the continuous commitment over many years, even decades, of professionals working on practical issues in the provincial rather than metropolitan arena. They improved regulatory standards while encouraging small-scale commercial activity mostly in the farming and agricultural value-adding sectors, also developing public services such as electricity and piped water.

Sub-Saharan countries and less developed countries around the world, today, are not exceptional. Their situation is very similar to that of developed countries 200 years ago, with ineffective public services in rural areas, extreme poverty and disease, and poor regulation of commercial activity which limiting economic opportunities for the general public. The same solutions that worked in these countries, are needed in today's LDCs.

Foreign aid finance has already helped to establish decentralized governance in many countries, with the intention of laying foundations for rural development. Aid-assisted large infrastructure investments are key inputs. However, foreign aid is not effective currently in supporting rural development through better rural public services which raise the general standard of living and transform national economies. It does not help to secure the continuous commitment of professionals in the provincial arena to better governance, to effective entrepreneurship stimulated by appropriate regulation, and to delivery of stable and financially viable public services. If one looks specifically at the rural water sector in LDCs as Uganda, this failure is very apparent. The many programs and projects that come and go are not harmonized in a way that establishes a single clear framework that is well understood and supported by all the actors involved, including development partners alongside local entrepreneurs, civil society leaders, service providers and government officers and politicians. Currently foreign aid in the rural water sector is working against this essential focus, by fostering severely uncoordinated activity. In Uganda, tremendous achievements have been made by the national government in establishing policies, processes and procedures for installing rural infrastructure, monitoring performance in the water and environment sector, channelling finance through provincial legislators, and regulating services delivery. However, the Ministry of Water and Environment (MWE), the local district governments (DLGs), local leaders as well as the "the man on the street" are keenly aware that rural water service delivery and associated economic development is not happening. They are aware of poor fiscal management at all levels, essentially due to the absence of a focused single coherent framework for everyone to agree to and follow, at least at regional scale if not a national scale.

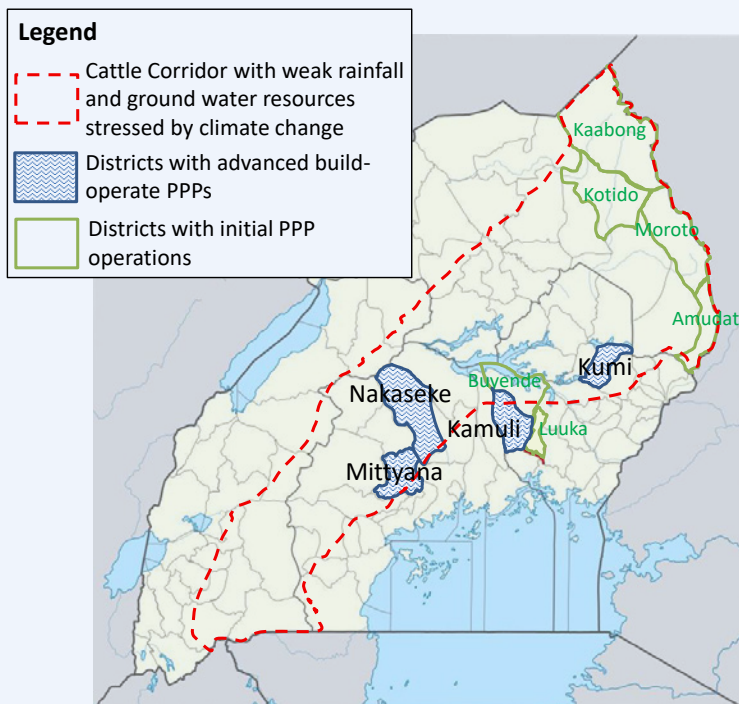


Figure 1: Uganda: Rainfall and ground water zones, with rural water Public-Provider Partnership Districts having potential as early-start Service Area gazettes to a pioneer Rural Water Utility

So, everyone is asking, "what's the plan?"

This article describes an approach taken by four district governments who have developed a "plan", which has variously been called, in context of rural water service delivery, the "Rural Water Utility", "Service Area Provider", "Public-Provider-Partnership" or "Improved Community-Based Maintenance System". **Figure 1** shows the locations of the districts involved. The local government in each district has signed Public-Provider Partnership (PPP) agreements with a Ugandan non-profit company Whave Solutions, which is acting as a pioneer Rural Water Utility (RWU). In three of the four districts, as shown in **Figure 2**, progress has been made already to transform service delivery, evidenced by functionality rates consistently better than 97% in recent years (less than eleven days of downtime per year on average, adequate functionality the remainder), in contrast to baselines generally lower than 65% (sub-adequate performance and downtime almost half each year), in some districts as lower than 30%. The intention of these four pilot PPPs is to consolidate the early proof-of concept work shown in **Figure 2**, to develop fully viable service delivery applicable at national scale, and answer the key questions: "who, what, how": who does what, who pays for what, what are the costs, and how are the costs met?

Who does what?

The solution discussed for the first question, who-does-what, is illustrated by **Figure 3**, indicating that the only sure way of resolving this question, is a set of clearly understood and agreed contractual agreements between

actors. The pilot PPPs have generated provisional versions of such contracts as numbered in the figure. The performance contract signed by Whave as a pioneer RWU with District and Sub-county governments is numbered as

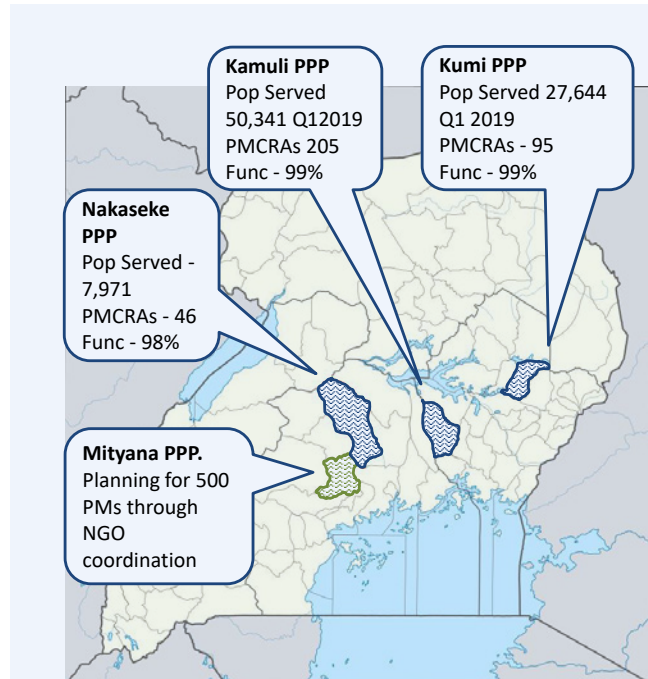


Figure 2: Functionality rates have consistently been above 97% for several years in the pioneer Service Areas. Baselines of adequate functionality vary from 27% to 66%. Whave's role as a pioneer RWU is reviewed quarterly by the District Governments and MWE representatives, in these Public-Private Partnerships

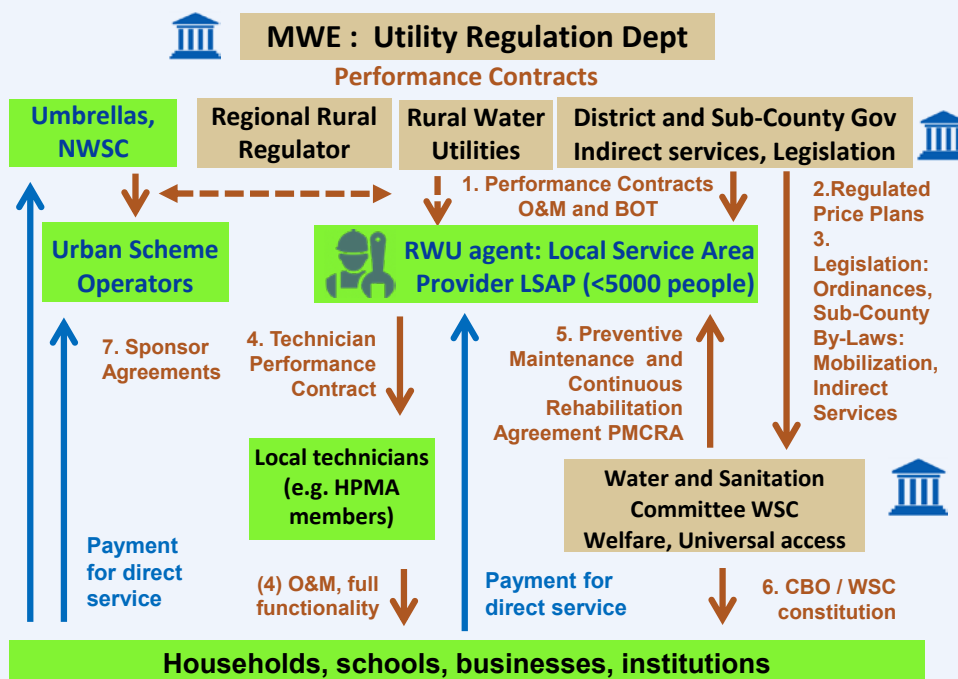


Figure 3: Agreeing the contractual framework. Sponsor agreements ensure maintenance contracts (PMCRAs) are prioritized by infrastructure build sponsors (politicians, NGOs)

contract 1; this is an initial formulation, as are numbers 2 and 3, the local regulations. Contracts 4 and 5 are in an advanced state, having been proven over some years, but are still being developed. There is debate still as to how the RWUs should be regulated, and how service areas should be defined for the urban utilities focused exclusively on large piped supplies in towns (the National Water and Sewerage Corporation NWSC and the Umbrella Authorities), especially in respect of point-sources (smaller piped systems, hand and wind-pumps, protected springs and similar) situated within their concession areas (known in Uganda as gazettes). These questions are expected to be resolved by the Ministry of Water and Environment in forthcoming years. It is often pointed out that a concession or gazette implies responsibility for all populations living within a defined geographic area, assuming communities are compliant to uniform tariff pricing just as in rural electrification programs. Therefore, while RWUs are needed immediately to solve the current rural functionality crisis with a sound contractual framework and tariff normalization as shown here, it is expected that all the utilities will merge in 10 or 20 years' time into a group of regional Public Water Utilities each one not distinguishing between rural and urban water users, assuring functionality for a mix of water sources and universal access including point sources (such as small piped systems and hand-pumps) and larger piped networks.

Figure 3 shows that RWUs operate through Local Service Area Providers (LSAPs) which may be branch offices, semi-autonomous franchisees or cost centers focused on financial viability, balancing operational cost against tariff revenue, demonstrating accountability and financial transparency to local government oversight bodies and the communities they service. RWUs provide essential back-office services to several LSAPs such as optimum price and quality hardware purchasing, engineering, accounting, and professional management. Nevertheless, the LSAPs are responsible to fulfill performance contracts through quarterly reviews and audits with the District/Sub-County Local Governments and MWE agents and the communities they serve while working in partnership with the Government Enabling Services. Throughout this paper, the term RWU refers equally to the district-based LSAPs which can be a Hand-Pump Mechanics Association transformed to become local franchisee company maintaining piped point sources as well hand-pumps, wind, pumps, and other water sources. Whave is training HPMA's in this regard.

Who pays for what?

None of the contracts described above can be written and signed without clear agreement first as to who-pays-for-what. **Figure 4** show the taxonomy of cost under discussion. The classification of cost is deliber-

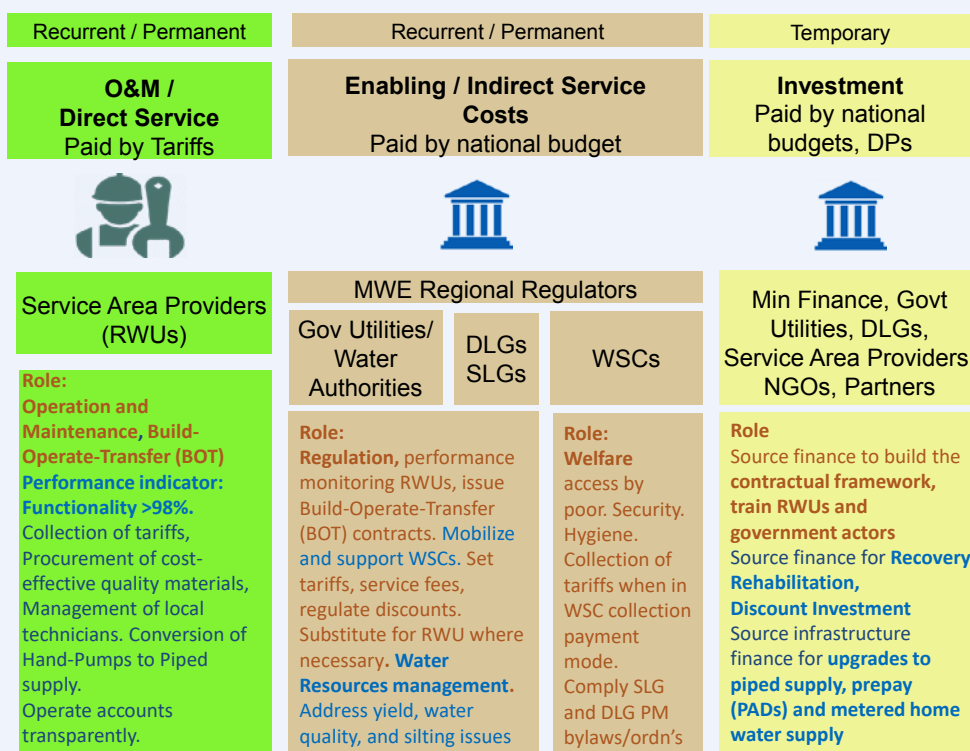


Figure 4: Three Cost Items

Component	Unit Cost [UGX]	Lifetime [Years]	Average Annual	Lifetime Anticipated	Expected Average Annual Cost [UGX]
Pump Head Assembly					
<i>Examples</i>					
M12*20 Hex Bolt [Top Bolt]	1,000	2	500	3	333
M12 Washer [Axle Washer]	1,200	2	600	3	400
M10 *40 Hex Bolt [Chain Bolt]	5,000	2	2,500	3	1,667
U2 Water Tank w/ 32 mm Socket	120,000	10	12,000	15	8,000
Other components	806,200	various	various	various	various
Total Cost	933,400		176,058		130,042
Riser Main [24 m]					
<i>Examples</i>					
U2 PVC White Pipe 1.25"	45,000	8	5,625	12	3,750
U2 SS Connecting Rod [12 mm, SS202]	73,000	10	7,300	14	5,214
U2 SS Rod centraliser	3,500	6	583	8	438
Other components	1,007,500	various	various	various	various
Total Cost	1,129,000		132,494		106,392
U2 Cylinder Assembly					
<i>Examples</i>					
U2 Upper Valve Rubber seating	3,000	1.29	2,328	2.0	1,500
U2 Lower Valve Sealing Ring	2,000	1.13	1,769	2.0	1,000
U2 Lower valve	22,000	3	7,333	4	5,500
Other components	242,200	various	various	various	various
Total Cost	269,200		63,000		49,083
Civil Works					
<i>Examples</i>					
Concrete Apron Casting	129,000	10	12900	15	8,600
Concrete Drainage Channel Casting	86,000	10	8600	15	5,733
Total Cost	215,000		21,500		14,333
			393,052		299,851
VAT is included in this pricing, therefore projection is conservative \$81/year/ hand-pump					

Figure 5: Hardware replacement: OpEx and CapManEx

ately kept very simple, dividing into permanent recurrent costs and temporary investment, with recurrent cost sub-divided into Direct and Enabling Service. The former, Direct Service, is the task of keeping rural water sources working reliably. Who pays this cost? Communities sign into agreements which oblige them to pay a Service Fee covering this cost.

The amount of the Service Fee is agreed between the RWU and the local government, in its role as a decentralized legislator. This illustrates already a feature of the second recurrent cost category, Enabling Service.

The Enabling or Indirect Service role encompasses functions such council meetings in which regulation is formulated, concession licensing (or "gazetting") of the RWU, public information programs and "mobilization" and "sensitization" of communities helping them to understand and volunteer to enter into service agreements, and attention to resource management and environmental issues. So far in practical terms, the pioneer pilot PPPs involve quarterly review meetings in which each district reviews the performance of the pioneer RWU, looking at questions such as "how functional are the water sources?, are people happy with the service?, are they they paying their bills? and so on. The review meetings are still in an early stage of development. The cost of the Enabling/ Indirect Service role is met through central and local government budgets, is therefore a national tax issue.

The third cost category is investment which by definition is not recurrent. Major components are infrastructure

construction, which includes new hand-pump installation as well conversion of hand-pumps to piped systems, introduction and proving of new advanced technologies such as pre-paid automatic water dispensers (PADs), training stakeholders in the contractual framework, restoring sub-standard installations ("recovery rehabilitation"), and assisting RWUs to reach breakeven customer volume through promotional pricing.

What are the costs?

Direct Service

The Direct Service Costs incurred by the RWU can be conveniently divided into three: hardware replacement, local technicians' fees, and management. **Figure 5** shows hardware cost evidence collected in recent years by Whave for hand-pumps, combined with growing evidence of savings that are made through functionality-performance incentives for technicians, involving their following preventive maintenance schedules and making increasingly accurate judgements as to necessity and timing of replacements. The RWU / Service Area Provider / PPP model corrects a serious flaw in current rural water service delivery, which is the tendency of district water departments to oblige communities to attend only to "minor" repairs. This has been a perverse incentive causing neglect of routine servicing and minor repair to shift all maintenance into the major replacement category taken on by government. Because of budget shortages and poor fiscal management, this

“wait-till-it-breaks” tendency (a key reason for the low functionality rates mentioned in **Figure 2**) has led to frequent source abandonment and persistent rehabilitation waiting lists, followed by sub-standard rehabilitation works, their poor quality driven by the further perverse financial incentive that construction and rehabilitation is not integrated with operation and maintenance service contracts. To correct this, the approach described here allocates all hardware component replacement to the service fee calculation.

A key innovation introduced by Whave with MWE support in 2011, has been performance-payment of local technicians for their labor. The same technicians who operate in baseline conditions of very low functionality are recruited by the RWU under contracts which stipulate payments against clearly defined monthly outputs. The outputs include source functionality, downtimes less than two days, correct utilization of RWU hardware stock, parts replacement timing and record keeping, correct signing-off by communities, undertaking physical checks four times a year (one being a below-ground overhaul), and so on. This innovation has generated the high functionality results achieved since 2013, alongside the RWU purchasing high quality stock. It has introduced a new cost item, management of technicians, since performance-payment involves monitoring of functionality, and administration of technician contracts. **Figure 6** shows estimated spend in 2018 on local technicians’ direct service labor costs and associated management. The management costs include professional engineering staff, accounting for quality stock procurement and for administration of payments. Actual costs shown here include both regional office (Kampala HQ) and local RWU team costs. Management costs in Q4 2018 dropped due to staff transfers to commence a new PPP in Mityana District. All technicians contracted by Whave are members of the official Hand Pump Mechanics Association (HPMA) of the district, in line with government policy for HPMA to undertake maintenance.

Figure 7 indicates management costs projected for the RWU serving a population of one million people using hand-pumps, which is considered the RWU cost-revenue breakeven, together with technician labor costs. The evaluation of management expenditure at scale is approximate, and is expected to be improved over time as the cost modelling exercise proceeds in 2019 and in future years.

The table also shows that current expenditure on hardware replacement is small in comparison to future projected expenditure. This is a direct result of the situation described above, that rehabilitation work, and indeed fresh construction also, being sub-standard in most instances. A service agreement is only feasible if the hand-pump is first restored to adequate functionality, a task called “recovery rehabilitation” or restoration. Most of the hand-pumps Whave is servicing have recently been restored, such that average hardware replacement cost is currently low. Restoration is only done once, and cannot be fairly attributed to tariff due deteriorated standards, and is therefore a temporary investment cost, while future replacement of major and minor components after the recovery stage, is an ongoing recurrent cost.

Collection of tariff in rural areas adds a further component to service cost. This is addressed below in context of “how are the costs met?”

Investment

Figure 8 provides evidence gathered in the year 2018 as to investment cost, in the column titled “2018 Actuals”. An important investment item is promotional pricing or “Discount”. The process of building social consensus on tariff payment for maintenance, is constrained by the prevalence of NGOs and politicians offering free repairs, and many district water officers offering major repairs. This principle of payment by communities for maintenance, has been enshrined of 20 years already in the official government policy of

	PMAs	Number of technicians (HPMA members)				Direct service spend				
		Kamuli	Kumi	Nakaseke	Total techs	Total technician earnings	Average tech/ source / year	Total Management /year	Management / PMA /year	Total excl hardware /year /PMA
2018 Q1	233	5	2	2	9	\$2,928	\$50	\$43,005	\$738	\$789
2018 Q2	268	10	5	2	17	\$3,575	\$53	\$51,783	\$773	\$826
2018 Q3	292	10	5	2	17	\$3,465	\$47	\$50,554	\$693	\$740
2018 Q4	341	11	7	2	20	\$4,081	\$48	\$36,752	\$431	\$479

Figure 6: Performance-pay contracts have ensured very high functionality rates, but incur a management costs which are a combination of back-office RWU costs (engineers and account based in Kampala) and Local SAP team costs

Direct RWU + LSAP Service Costs: Actuals and Service Area with hand-pumps			
WhaveActuals Dec 2018 Per Hand-Pump per year		Projected Scaling and incl CapManEx Per hand-pump per year	
87,248	People	1,000,000	Peope in Service Area
341	Hand-pump communities	3,908	Hand-Pump communities
99%	Average functionality	99%	Average functionality
256	Average persons/hand-pump	256	Average persons/hand-pump
\$48	Technicians earnings	\$48	Technicians earnings
\$27	Hardware replacement (OpEx)	\$81	Hardware: CapManEx and OpEx
\$431	Management	\$125	2.5x increase in Management
NA	Non-Revenue Water	20%	Non-Revenue Water
\$506	Total Direct Service	\$319	Total Direct Service

Figure 7: The management costs shown include back-office RWU costs (engineering and accounting support, etc) as well as local SAP team costs

Community Based Maintenance, but has not been applied effectively, and largely replaced with illicit gains made from procurements of hardware during construction and major repairs or rehabilitation. As a result, collection of tariffs to pay for the full service cost above is not possible immediately and promotional pricing is necessary for a temporary period. **Figure 8** assumes conservatively that six years will be needed for initial service areas to remove promotional pricing and decline discounts to zero.

The category "PPP system build" includes the cost of meetings with stakeholders to design collaboratively the Service Area Provider approach (for example application of Contract 7 in **Figure 3**, Sponsor Agreements which prioritize maintenance agreements as preconditions of infrastructure expenditure) as well as the cost of managing investment activity. Investment includes the hardware and technician labor for restoration of sub-standard installations with correct quality components for which communities make a standardized "HP recovery rehab" contribution.

Figure 8 shows two scenarios: a conservative projection with constrained budget allowing only 5% of the population of the Service Area having hand-pumps to be converted to small rural "point source" piped systems; and a more ambitious scenario where 30% benefit from conversion. It is generally acknowledged that the most rapid conversion possible to piped supply constitutes a cost-efficient method of addressing the severe health, hygiene and sanitation issues afflicting most rural communities, because water is accessible closer to home through tap-stands and yard taps.

Enabling / Indirect Service

The recurrent Enabling Cost met by the government is not evaluated yet, but is assumed at this moment to be within current budgetary provisions. This is controversial since salaries of government officials and their expense budgets are so low that we commonly hear "there is no money even for fuel to visit the villages on a motorbike". However, local government budget provisions do exist currently for maintenance hardware purchases, and for community mobilization and regulation activities, and the correct starting point in evaluating the cost of Enabling Service is to first see what improvements in spending efficiency are feasible and how the existing budgets can be used for the RWU and LSAP regulation and support function. For example, considerable sums are currently spent on rehabilitation, labelled "maintenance" in the local government budgets, while the waiting lists for rehabilitation do not shorten and sources are constantly falling out of use and adding to the list, sometimes the same ones that were recently rehabilitated. It is acknowledged by the district water departments engaged in the three pioneer PPPs, that these budgets are better utilized to support the preventative maintenance agreements signed by communities with the RWU, and some transfer of hardware to the RWU from the District Water Departments has already taken place accordingly, although to a limited extent so far. It is also the case that the sub-county councils engaged in the PPPs have passed provisional legislation (at "resolution" stage so far) which mandates communities to sign into Preventive Maintenance Agreements with an approved RWU. Some councilors, CDOs, Senior Administrators, Parish

Chiefs and other officials and politicians have used their resources to implement such resolutions in practice, for example by visiting communities to inform them of the opportunity to sign into service agreements, and to help WSCs collecting tariffs for the Service Fee, to discipline recalcitrant community members.

Universal access to water

In all the management options described above, a community water and sanitation committee (WSC) is acting as public body representing the interest of all the community members; it is part of the Public-Provider Partnership. It is sometimes integrated into the management committee of a VSLA. One of its functions is to ensure that any individuals unable to pay water tariffs at any time, still have access. This welfare responsibility is in its constitution, the contract number 6 in **Figure 3**. It also has responsibility for the security of the public water source facility, since security is also an assurance of universal access, although this may be shared in the build-operate-transfer clause in contracts 1 and 5, in cases where the RWU employs a local attendant a caretaker. The welfare function is not simple to administer and for this reason the WSC may need to have remuneration for a responsible member. Welfare is therefore a cost item, as shown in **Figures 10 and 11**. In the three PPPs described here, all have sub-county resolutions in place mandating PM CRA signing with the approved RWU and also mandating that all WSCs must be registered as legal entities, in order to establish their liability status in regard to welfare as well as administration;

most WSCs signed into Whave PMCRAs are in fact registered as legal entities.

How are the costs met?

Tariff payment

The dominant question is whether tariffs at the levels required to meet the Direct Service cost described above are affordable, and whether they are politically and socially acceptable.

In the baseline situation currently experienced by most rural communities, two methods are used to meet costs, although in both cases with severe failings, one method being applicable in farming communities and one in rural trading and market centers. These are Subscription, and Pay-for-Volume (PfV).

Most farming communities profess to paying a subscription, usually 1000 Ush/month (about 30 USD cents), into a maintenance fund. In practice it is usual for subscriptions to be remain unpaid; instead, a mechanic's bill is shared when a break-down occurs. The failing in this case is the prevalence of frequent and prolonged downtimes, deployment of sub-standard materials, and excessive expense sometimes resulting in abandonment of the water supply infrastructure. Increasingly, vendors carry water to farming communities on motorbikes selling to wealthier members by jerry-can, due to the hand-pumps often being non-functional, which has the effect of even less attention being given to functionality and less wealthy community members being resigned to routinely fetching unsafe surface water.

Most rural trading centers have facilities such as hand-

Investment over 6 years: 2020 to 2025				
Temporary Expenses: PPP System Build, Infrastructure Capital				
People served with full functionality		1,000,000	1,000,000	
Percent of people converted from hand-pumps to piped		5%	30%	
Actual average people per hand-pump		256	256	
Projected number of people per piped supply		1,000	1,000	
Number of hand-pumps restored and functional		3,713	2,736	
Number of new point-source piped systems		50	300	
Number of people with functional piped systems		50,000	300,000	
2018 actual		Projected 6 yrs		
\$63,211		PPP System Build at same rate	\$379,264	\$379,264
\$178,850		Discount declines to zero	\$695,986	\$695,986
\$30,156	\$227	HP Recovery Rehabilitation	\$841,858	\$620,317
(\$86,859)	(\$27)	Community HP Rehab contribution	(\$99,758)	(\$73,506)
	\$20,000	Projected average capital cost of conversion to Piped	\$1,000,000	\$6,000,000
		Total	\$2,817,350	\$7,622,061

Figure 8: Investment in a Service Area

pumps, tap-stands fed by a motorized borehole or gravity, or visiting water vendors carrying water on motorbikes. These facilities commonly charge on a Pay-for-Volume (Pfv) basis at prices between 200 and 1000 Ush per 20-liter jerry-can. The failing here is that less wealthy members of these communities do not pay these prices and use surface water instead or walk long-distances with associated risks.

Under the RWU/LSAP approach developed by Whave and described in this paper, both these payment modalities are revised, and are labelled Improved Subscription and Improved Pfv hybrid (iPfvh), as shown in **Figures 9, 10, 11**. In both these modalities, the RWU or its agent, the Local Service Area Provider (LSAP) is responsible for assuring reliable functionality and charges a service fee. The WSC is the public body representing the community, and it signs a Preventive Maintenance and Continuous Rehabilitation Agreement (PM CRA) with the RWU/LSAP, shown as Contract 5 on **Figure 3**.

In both modalities, the body responsible for collecting tariffs can be either the WSC or the RWU/LSAP. In the Improved Subscription mode as currently practiced by Whave, it is the WSC, while in the iPfvh modality, there is a strong trend to the RWU being the tariff collector since this fits well with preparation of communities to upgrade from hand-pumps to piped supply (tap-stands near homes and household connections). In both subscription and Pfv, direct collection by the RWU/LSAP is increasingly seen as the preferred approach for another reason: the cost-efficiency of cashless tariff collection using through Pre-Paid Automatic Water Dispensing (PADs), involving management of tariff revenue by the RWU.

The term "hybrid" is used because in iPfvh mode, some consumers pay a subscription, for example a school may pay on a per-pupil-per-term basis, as shown in **Figure 10**. Whave is assisting rural communities to freshly constitute or modify existing Village Saving and Loan Associations (VSLAs) to include a sub-committee taking the role of VSLA. This approach avoids the serious problems that beset most WSCs and introduces to the communities the prospect that water maintenance tariff revenue surplus is automatically available for income generation benefit to all community members, avoiding the risk of communities losing trust in their WSCs which is a common experience in the baseline situation.

In both payment modalities and their combinations and variations, the problem of non-economic communities is very severe. Small communities of less than 50 homes, without a local business, school or clinic that may have funds to contribute for water maintenance, find it extremely difficult to raise even the RWU service fee, let alone local community costs. On the other hand, larger communities, or those with shops, a market, a school, and businesses, generate larger revenues often exceeding costs, so generating profits for water suppliers. **Figure 11** provides an example showing how the Pfvh model can

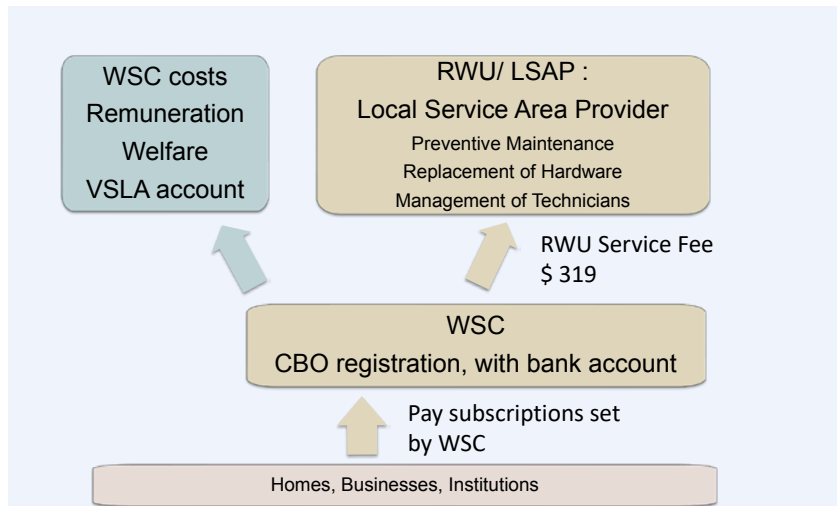


Figure 9: Improved Subscription, collection by WSC, fixed charge to RWU/LSAP (Hand-pumps and Piped supply)

serve both types of communities, applying a single tariff structure to ensure that all costs are met, including both the RWU Direct Service charge for technicians' labor, hardware replacement and management, and community costs such as Attendants' fees and the VSLA. The high-revenue community generates a surplus, which is used to assist the Attendant, the RWU and the VSLA in the low revenue community. This is not referred to as cross-subsidy since it is internal to the workings of the RWU, just as in an insurance company.

It is expected that Attendant costs will reduce as Pre-Paid Automatic Water Dispensers (PADs) become more reliable in remote areas. Investment in this technology,

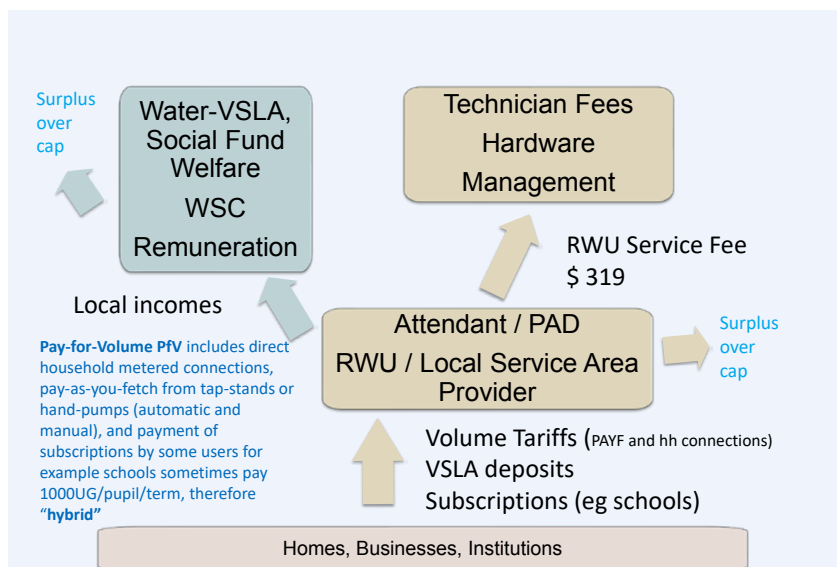


Figure 10: Pay-for-Volume hybrid, direct Collection by RWU/LSAP (Hand-pumps and Piped supply)

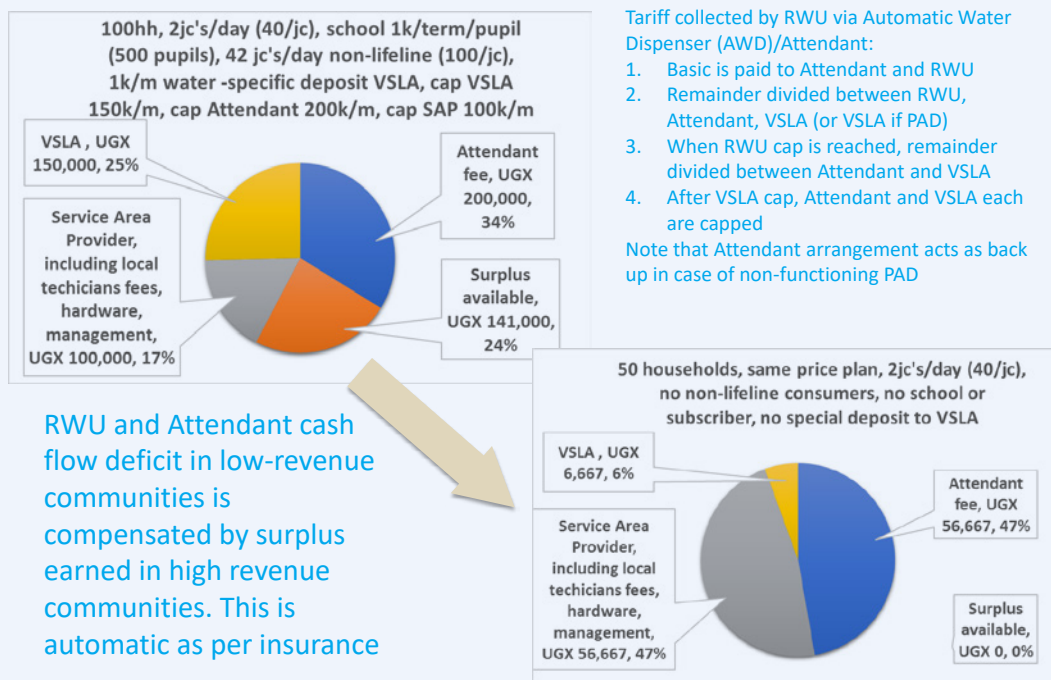
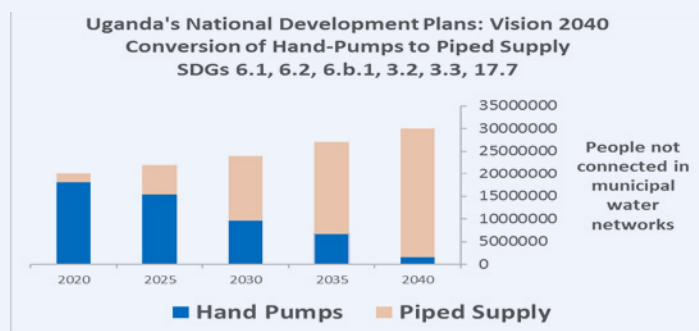


Figure 11: Pay-for-Volume hybrid, direct Collection by RWU/LSAP
 Hand-pumps/point source piping. VSLAs for deposits/standing charges, deposits exempted in small communities. Min payment is 200UGX/5 jerry-cans as health incentive, except welfare exemptions. Pie charts show monthly revenues. Income from household connections is not yet shown: this is known to improve economics

and in building its reliability in field conditions, is important. Currently, the costing of Attendants fees is necessary to back-stop tariff collection while automatic dispensing is technically mature.

Scaling and saturation

Uganda's National Development Plans project a middle-class country by the year 2040, with rural populations having reliable services such as water supply. **Figure 12** shows this ideal represented in the form of conversion of most hand-pumps to piped supply for the segment of the population not connected to municipal water networks. Is this a feasible goal? This solution lies in practical thinking. **Figure 13** shows the first step necessary, which is the decision by aid agencies working on SDGs 6.1 and 6.2, to join hands together to help neighboring district governments create or "gazette" pilot service areas for reliable water and conversion to piped supply, based on a single contractual framework and financing approach. The % pipe conversion depends on budget, as shown in **Figure 8** above, and the time-scale could potentially be less than the six years shown, depending on coordination commitment. More than one pilot service area could be created at the same time. Currently, aid agencies design and implement relatively small interventions in widely scattered locations, therefore missing the opportunity to address the service delivery issue. With saturation, social consensus on tariff payment is achieved since water users do not find a neighboring pump free of charge. Scaling the saturated area to one million people served with full functionality, creates financial breakeven for the RWU involved and



Piped supply is key solution for SDG 6.2, universal access to improved hygiene and sanitation. Conversion of hand-pumps to piped supply is also a solution to the functionality problem, because people are more willing to pay the necessary tariffs for professional maintenance service, when water is accessed at taps. Investment has a four-fold economic return in rural economic productivity and reduces urban migration and unemployment.

Figure 12: Vision 2040 and SDG 6.1 and 6.2

enable the local government to implement appropriate regulations such as those already piloted, since they now are valid for everyone in their governance area. By way of example, the rural populations of the neighboring districts Mityana and Nakaseke shown on **Figures 1 and 2**, sum up to a total of approximately 400,000 people following the 2014 census figures. If some of neighboring districts of Gomba, Butambala, Kiboga, Mpigi and Luwero, were linked into a single build-operate and O&M contractual and financing framework such as described here, a service area of over 1 million rural people would be a base for replication nationally of functional water sources linked to transformation of hand-pumps to taps.

Feasibility and timescale

Figure 14 shows a projection of breakeven in a pilot service area assuming a mix of payment modalities. The discount investment expense is clearly illustrated as synonymous with the breakeven process. The time-to-breakeven could be shortened by strong co-ordination of aid agencies and district governments, as mentioned above, but this would also demand successful "election-proofing". Electioneering is a gifting and promise culture, similar to the NGO culture of gifting and promising. Already in late 2018 and early 2019, and increasingly through 2019 and 2020, electioneering includes gifting

of rehabilitations, new hand-pumps, and promises that repairs will be done free of charge. This directly unravels the saturation and scaling necessary for effective rural service delivery, improved health and productivity, stemming of urban migration and national economic development. All the rival politicians could be requested to treat rural water service delivery regulation as a non-negotia-

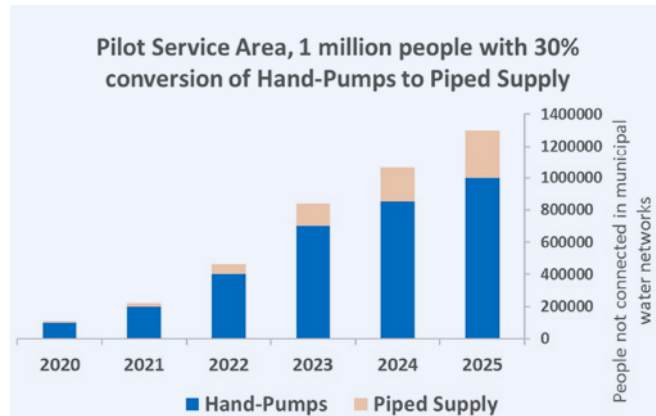


Figure 13: Pilot Service Area by year 2025 with 30% piped water: 300,000 people converted from hand-pumps to functional taps, and 700,000 people with functional hand-pumps (restored by a RWU) still waiting for conversion to pipes in forthcoming years. Eligibility for conversion to pipes dependent on tariff payment

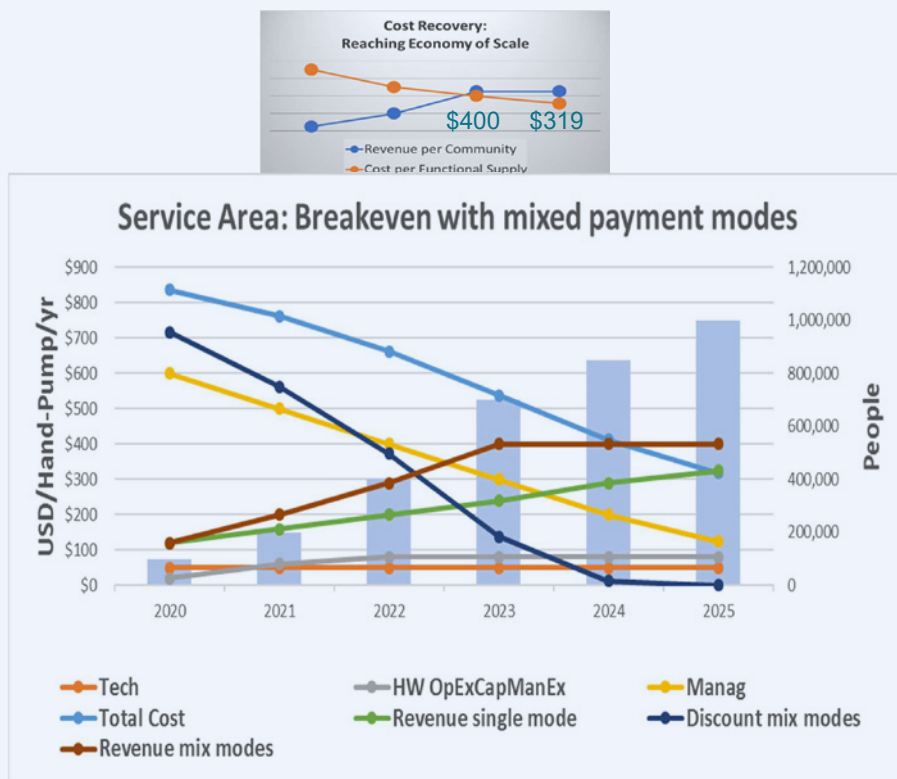


Figure 14: Time to breakeven. The chart projects a mix of payment modalities, which is the practical reality going forward. A concerted effort by development partners would ensure this break-even timetable is achieved

Service Area Provider (SAP) Whave Service Fee		2018		2019	
As on signed PMCR agreements		Declining Discount	After discount	Declining Discount	After Discount
Number of pipes	Community Service Fee CSF \$ /year	\$ /year	\$ /year	\$ /year	\$ /year
1 to 5	\$282	\$215	\$67	\$188	\$94
6 to 9	\$309	\$215	\$94	\$188	\$121
> 10	\$336	\$215	\$121	\$188	\$148
Additional Contributions:					
Institutions	\$322	\$188	\$134	\$161	\$161
Businesses	WSCs discretion				

Figure 15: Whave’s declining discount 2018 to 2019, in three districts with Improved Subscription modality. Combined with pressure of electioneering 2019-2021, this reduced discount is likely to reduce the number of PMAs active. But if investment finance for full saturation is not available, service viability and the number of PMAs cannot rise anyway.

ble rule for everyone, like driving on the same side of the road. Or conceivably they could compete not on gifting free repairs, but instead competing on how much they top-up the payments received by VSLAs and RWUs from tariff collections. They could all follow one rule, for example topping up is allowed but encouraging non-payment of tariffs is not allowed, just as in municipalities, they would not promise potential voters that their metered tariffs will be reduced, for fear they would not sound credible. One important role for aid agencies, is to generate this type of consensus amongst electoral rivals.

Figure 15 shows how Whave is reducing the discount on service fees as 2018 moves to 2019. This shift unfortunately coincides with increasing electioneering activity and is therefore likely to have the effect of reducing the number of communities freshly signing into service agreements or keeping up with service fee payments. However, funding for recovery rehabilitation is insufficient, and it is not reasonable to expect communities to pay to correct illicitly sub-standard installations. The logical conclusion is that progress cannot be expected without finance at the amount needed for complete saturation of at least one service area, as presented in **Figure 8**. Discussions with the rural water department of MWE indicate the saturation approach would receive central government support for gazettes (area concession licensing) which would demarcate communities with population of less than 5000 people (currently the MWE rural / urban demarcation), or possibly a smaller demarcation number, also a necessary condition. This finance would include provision for coordination of NGOs and District Governments in the service area targeted, and would be supplemented therefore by NGO budgets in that service area making higher conversion rates to piped systems possible.

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