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Analysis on IRC's use of Pay as You Fetch Kabarole district, Uganda



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Photo credit: Martin Watsisi

Author: Caleb Cord

Reviewers: Martin Watsisi and Jane Nabunnya Mulumba

Editor: Juliet Heller

Proofreader: Vera van der Grift

Layout designer: Dechan Dalrymple

IRC Uganda

Visiting address

Plot 52A

Ntinda II Road

Naguru

Kampala, Uganda

Postal address

P.O. Box 40398

Kampala, Uganda

Phone : +256 758 200 782

uganda@ircwash.org

Analysis on IRC's use of Pay as You Fetch Kabarele District, Uganda

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Caleb Cord - PhD student, Environmental Engineering

University of Colorado Boulder,

Mortenson Center in Engineering for Developing Communities

Contents

WHAT IS PAY AS YOU FETCH, AND HOW DOES IT WORK?	1
Introduction	1
Existing model and relevant stakeholders.....	1
ANALYSIS ON PAYF	2
Data gaps.....	2
Data trends and observations on existing PAYF boreholes	2
Case studies: contextualising successes and challenges at three PAYF boreholes in Kabarole District.....	3
Desktop review: exploring ways to improve PAYF	5
CONCLUSIONS AND RECOMMENDATIONS	7
Improving data collection	7
Tariff structure experimentation	8
Stakeholder engagement.....	8
Cost recovery analysis.....	8
Additional research	8
Capacity building	8
REFERENCES	9
APPENDIX A: CASE STUDY ON THREE WATER POINTS OPERATING UNDER PAYF	10
Mukumbwe hand pump	10
Burungu hand pump	10
Kanyamyegodi hand pump	11
APPENDIX B: WATER POINT CARETAKER SURVEY	13

List of Figures

Figure 1: Full cost recovery, Financing and Cost Recovery, IRC (2003).....	6
Table 1: Comparison of funds received with meter readings on PAYF hand pumps	3
Table 2: Various costs of service provision, Financing and Cost Recovery, IRC (2003).....	6

What is Pay as You Fetch, and how does it work?

Introduction

The Learning Alliance in Kabarole District, Uganda (Kabarole WASH Task Team) is part of IRC's broader learning alliance approach: alliances which promote learning within the WASH sector through local, regional, and often national stakeholders by providing a platform for discussion, debate and iteration on key issues. The Kabarole WASH Task Team has begun piloting a pay as you fetch (PAYF) management model as a potential solution for improved water service delivery and sustainability in Kabarole District. The International Water and Sanitation Center (IRC) in Uganda first began considering PAYF adoption following a presentation given by Water for People at the Rwenzori Regional Learning Forum, held annually for several districts in Western Uganda. The concept was largely based on Water for People's successful use of PAYF under their Water as a Business model.

The decision to pilot PAYF in the district was largely a capacity-building effort for the Kabarole Hand Pump Mechanics Association (KAHASA). IRC in Fort Portal works closely with KAHASA on several efforts, and has been instrumental in their establishment and growth. It is hoped PAYF will prove to be an effective method for sustainable water service delivery from hand pumps around Kabarole District, with potential for scaling up throughout Uganda.

Existing model and relevant stakeholders

The PAYF concept is simple. Each time a person fetches water, they pay a set price per container of water collected. IRC has found that the best hand pumps are those that have failed under community-based management, a model that has historically been encouraged by the Ugandan government, but which depends largely on voluntarism and requires no tariff setting or collection. This lack of water payment often results in inadequate funds for operation and maintenance, which then leads to a decrease in the likelihood of sustainability of the water point (Watsisi, 2017). PAYF has the potential to improve water point functionality and sustainability in Kabarole District, a "promising innovation in the rural water sector in Uganda," according to Diana Keesiga in a blog posted by IRC (Watsisi, 2017).

The process begins with the rehabilitation of boreholes that are non-functioning. During rehabilitation, water source protection from contamination is addressed by placing a fence around the system and planting grass (Watsisi, 2017). The process started in Kabarole with the IRC-funded rehabilitation of 10 boreholes in October 2016. Five more were then rehabilitated in the following months, and there was one additional rehabilitation by a town council in the district.

Desire for change is generated through reflection with the community. This engagement is carried out through the community's local leaders, and the reflection process facilitated by extension staff and hand pump mechanics to demonstrate the potential for PAYF to address the community's needs. Once motivation for adopting the approach has been established, informal agreements are drawn up with the communities called Memorandums of Understanding (MoU), under which communities begin employing KAHASA to perform preventative maintenance services at regular periods and for a fee. Community members agree a set price per jerrycan for water from the hand pump, ideally influenced by a life-cycle costing approach and capable of covering capital expenditure, capital maintenance, and operation costs (Watsisi, 2017). Theoretically, 20% of the funds collected by the community must be saved for preventative maintenance and repairs.

Currently this payment is withdrawn from the money collected by the caretaker as water tariff charges. KAHASA is responsible for reactive maintenance when a problem is reported with the handpump, and this is ideally paid for by the water tariffs collected. Often the caretaker of the water point, who is appointed by an established and registered Water User Committee, is paid from the funds collected.

The Learning Alliance's interest now is to see how the model performs in Kabarole and how its performance can be improved and scaled. Currently IRC pays a member of KAHASA to collect data from each hand pump operating under PAYF. Data has been collected for four months, beginning in February 2018. The goal of this analysis is to provide insight as to the model's potential feasibility, sustainability, and effectiveness by looking at its performance to-date. However, it is important to recognise that with the small quantity of data collected at this point, a standard analysis of trends is not yet possible. Instead, there was a broad assessment of the data to look at the performance of each water point under PAYF so far. To supplement this, information was gathered to gain perspective around successes and failures of PAYF implementation at boreholes around Kabarole District through interviews with relevant stakeholders, and a small desktop study on hand pump mechanics in Uganda, operation and maintenance, and cost recovery. Further analysis should continue as more data is collected. This recommendation - along with other suggestions for future data collection and implementation practices - is addressed in the "Conclusions and recommendations" section of this report.

Analysis on PAYF

Data gaps

Data on PAYF has been collected for a short period - beginning in February 2018 and continuing to the present. At the time of this analysis, data has been collected through June 2018. Data is collected on: meter readings; breakdowns in the past month, including service downtime, parts replaced, and cost for replacement and labour; financial information including funds collected, total savings thus far, monthly wages to the caretaker; stakeholders' visits to the water point in the previous month; and cleanliness of the water point at the time of data collection. While this data is helpful for gaining a broad idea of how PAYF is working at these different hand pumps, there are several data gaps that impede this understanding.

There is no clear benchmark for determining whether or not a hand pump is operating under PAYF for a given month; it is simply determined by the data collector and reported in a binary format. Also, no data is collected when it is determined that a water point is not operating under PAYF. This includes not only financial data, but also a lapse in recording of stakeholder visits to the water point, breakdowns experienced, or explanations for the lack of payment collection for water. No data is currently being collected for water quality at any of the water points either.

Data is not collected (apparently not even recorded) on the number of jerry cans collected, number of people visiting the water point, or number of people who receive water for free each day. The lack of reporting on the number of people who collected water from the hand pump contributes to a lack of knowledge about potential and actual income, and the corresponding insight into the model's sustainability. It is also difficult to see how much water wastage contributes to the wide gap between meter readings and funds collected, as will be discussed in the next section.

Data is being collected robustly on breakdowns: service down-time, parts replaced, and cost for parts and for labour. Unfortunately, it is difficult to draw meaningful conclusions or recommendations from just four months' worth of data. For example, if it was noticed that a certain part of the pump is breaking down repeatedly and affecting a majority of hand pumps, further investigation could be launched to understand why, and a possible intervention employed to address the cause. This data potentially offers valuable insights into model's performance, a point addressed in the "Conclusions and recommendations" section.

Data trends and observations on existing PAYF boreholes

District water office staff rarely visited the water points. They had only visited one of the sites, Burungu, once during the four-month collection period. Although it is known that politicians can influence willingness to pay for water (Cardone & Fonseca, 2003; Magara, 2014), they too scarcely visited the water points during the study period. Subcounty officials visited slightly more often than national government officials, though still not frequently. In Hapiida, Mugoma, Mugusu, Rweraza and Rusekere, subcounty officials visited the water point during two of the collection months. Several other water points were visited once during the collection period. NGO staff, Water User Committee members, and hand pump mechanics visited the water points at least once per month.

Of the 16 communities for which data is currently being collected, PAYF tariff collection is only successfully operating in six. Three more communities have had one month during the collection period where tariffs were collected. In general, it seems that successful uptake of PAYF collection is currently low, with less than 50% of communities consistently collecting tariffs. However, as previously mentioned, no data is being collected on the reasons for this. It also appears, based on conversations with the data collector, that willingness to pay and mindset are being assumed as the only contributors to PAYF failure/hand pump non-functionality in communities where tariffs are not being collected.

Of those communities which are collecting tariffs, meter readings and funds collected do not match up. Theoretical monthly income was calculated from the meter readings and two potential jerrycan prices: 50 Ugandan shillings (UGX) and 100 UGX per jerrycan (since the price per jerrycan for each specific site was not known). This theoretical income would assume that every drop of water that passed through the meter ended up in a 20 litre jerrycan which was paid for by the customer, which is very unlikely. However, it does help to see broadly that something is causing a discrepancy between meter readings and funds collected at nearly every hand pump operating under PAYF.

As Table 1 below shows, a significant amount of water passing through the meters is not being paid for. In some communities, only 1.7% of water passing through the meter may be paid for. This could be happening for several reasons, which include water wastage (pumping before and/or after the jerrycan is placed under the spout), free water given to community members, and different size containers being used besides the standard 20 litres.

However, current data collection methods provide no means of identifying causes for this.

Table 1: Comparison of funds received with meter readings on PAYF hand pumps

Community name	Date	Still under PAYF?	Meter reading (m ³)	Funds Received/Potential, 50UGX/JC	Funds Received/Potential, 100UGX/JC
Bugungu BH	30-03-18	Yes	19	13.33%	6.67%
Burungu BH	28-03-18	Yes	1881	53.41%	26.71%
Burungu BH	28-04-18	Yes	1940	25.42%	12.71%
Burungu BH	29-05-18	Yes	2033	25.81%	12.90%
Hapiida BH	30-03-18	Yes	366	42.35%	21.18%
Hapiida BH	29-04-18	Yes	417	40.78%	20.39%
Hapiida BH	26-05-18	Yes	478	0.00%	0.00%
Mugoma BH	29-03-18	Yes	1177	27.83%	13.91%
Mugoma BH	29-04-18	Yes	1223	26.09%	13.04%
Mugoma BH	29-05-18	Yes	1235	50.00%	25.00%
Mugusu TC BH	28-03-18	Yes	1826	5.52%	2.76%
Mugusu TC BH	28-04-18	Yes	1859	3.39%	1.70%
Mugusu TC BH	26-05-18	Yes	1906	8.94%	4.47%
Mukumbwe BH	29-03-18	Yes	99645	-157.32%	-78.66%
Mukumbwe BH	28-04-18	Yes	99619	-240.08%	-120.04%
Mukumbwe BH	29-05-18	Yes	99576	-60.47%	-30.23%
Nsororo BH	30-03-18	Yes	200	52.50%	26.25%
Nyabatahi BH	28-03-18	Yes	358	1.38%	0.69%
Rweraza BH	29-03-18	Yes	99890	-6.90%	-3.45%
Rweraza BH	29-04-18	Yes	99867	-109.57%	-54.78%
Rweraza BH	26-05-18	Yes	99838	-68.97%	-34.48%

Case studies: contextualising successes and challenges at three PAYF boreholes in Kabarole District

Considering that data has only been only collected and reported for four months at the time of this analysis, it is difficult to adequately assess how PAYF is performing through standard data analysis alone. Therefore, case studies were developed from conversational interviews with water point caretakers, Water User Committee (WUC) chairpersons, and/or community members at three water points that were rehabilitated by IRC and placed under an MoU for PAYF. Interviews were conducted for the Burungu, Mukumbwe, and Kanyamyegodi water points. In Burungu and Mukumbwe, the interviews were conducted in English. In Kanyamyegodi, Stephen Balyabuga from KAHASA assisted with translation.

These case studies shed some light on the successes and struggles currently being faced by communities where PAYF is being implemented. It is important to note that this is not a thorough qualitative analysis. Full case studies based on the interviews are in Appendix A. The questionnaire used to guide the interviews is in Appendix B.

From interviews with key individuals from the three water points, several themes emerged: community members generally care about quality service delivery; competition from other vendors/service providers influences the PAYF model, and can either be dangerous or beneficial to community members; willingness to pay is complicated and very context-specific; water is often given for free to community members, though this water is not recorded in any way for tracking purposes; records kept at water points are minimal, with only the amount collected at the end of each day being recorded. Additionally, water point caretakers expressed interest in and desire for additional training, which is discussed in more detail in the "Conclusions and recommendations" section. The following information is based on these interviews.

Further data collection is recommended for monitoring the success of PAYF at specific boreholes. Caretakers expressed various issues related to their community or hand pump which hinder success and sustainability, and suggested tailored interventions. Some communities experience very high willingness to pay, such as Burungu and Mukumbwe, whereas others have failed completely, having not consistently collected water tariffs from community members since the MoU was signed. Further data collection could look into the reasons behind each failure or success and look for trends to shape future scaling of the PAYF approach in other communities.

Water consumption, and the money theoretically collected from this, is much lower during the rainy season. At one of the hand pumps, the caretaker mentioned that during the rainy season, incentive is low for those who are employed by the water tariffs collected from community members (for regular cleaning, tariff collection, etc). This was regarded as an issue of concern, and could be addressed in the business model for the water system – for example, a base salary could be paid to those employed by the borehole, with an additional "incentive" payment on top of this based on income collected for that month.

In all three communities surveyed, service delivery was mentioned as a factor that community members care about. In Kanyamyegodi, where people refuse to pay and the hand pump is completely non-functional, an alternative water vendor provides water at 1,000 shillings per jerrycan. The MoU signed by this community states that water from this hand pump should cost only 25 shillings per jerrycan - a very low price. However, many community members are willing to pay the water vendor but not pay for water from the hand pump. When asked why, they said the vendor would fetch the water for them, and they could avoid spending the time and effort to pump their own water. They also commented that it was very hard to pump, indicating an issue with the technology itself.

In the other two communities where members were surveyed, interviews were conducted with the water point caretakers themselves. These communities have a competitor to the PAYF hand pump: water kiosks from the National Water and Sewerage Corporation (National Water). Since National Water kiosks do not require users to pump for water themselves; often operate under strict schedules; and commonly charge higher tariffs than the hand pumps, it is possible that their services are seen as superior to rural hand pumps. However, this competition does not seem to be threatening either of these hand pumps. In one community, members actually prefer the services offered at the hand pump: they are able to access water 24 hours each day, and consider it has better quality water. An added benefit is that water at the PAYF hand pump is cheaper.

Community members appear to care about service delivery: perception of water quality; availability of water; ease of retrieval from the source. There is also indication of room for competition, if there is increased demand for the services offered by PAYF hand pumps. For future scaling and implementation of PAYF and rehabilitation of boreholes, it is advisable to monitor National Water's plans for future development, and to ensure that PAYF prioritizes community members who have greatest need, and have limited or no other safe options. Because several communities currently operating under PAYF are in competition from National Water, it is important to identify where PAYF can usefully offer a safe and sustainable source of water, and focus on areas where National Water is not already providing coverage. This should be a top consideration when selecting future communities for PAYF water service delivery.

In general, water quality monitoring is not being carried out at any of the hand pumps currently operating under PAYF. This should happen at least quarterly and could be done by KAHASA with additional capacity building. Monitoring could be carried out through partnership with local government partners. It is important to analyze the quality of water that is provided to consumers in addition to addressing access. Sustainable Development Goal 6 (SDG6) requires "safe and affordable drinking water". Water quality results should be provided to consumers, and if it is demonstrated to be safe for consumption based on international standards, this could be leveraged for increasing willingness to pay.

Desktop review: exploring ways to improve PAYF

As a supplement to data collected through standard PAYF monthly monitoring and the previously discussed case studies, a brief desktop study was conducted on financial cost recovery and stakeholder engagement (especially Hand Pump Mechanics Associations and Water User Committees) in Uganda for water service delivery. The literature reviewed for this study can be found in the References section.

In Uganda, the major causes of rural water point non-functionality are technical breakdown and low yield (Nekesa & Kulanyi, 2012). Technical breakdowns could be addressed through PAYF implementation, with preventative maintenance potentially reducing any need for full future rehabilitation. In addition to major causes of non-functionality, there are also cited reasons for slow progress in improving functionality rates: weak institutional support for operation and maintenance; lack of supply chains for spare parts; low user willingness to pay for maintenance; and high maintenance charges by technicians (Magara, 2014).

The Ministry of Water and Environment identifies three key elements for improving functionality: the supply of spare parts, hand pump mechanics associations, and WUC's (Ministry of Water and Environment, 2010). WUC's are important stakeholders in rural water service delivery, and their functionality is identified as critical to success in a journal article on operation and maintenance of water points in Uganda (Nekesa & Kulanyi, 2012; Magara, 2014). Considering the dependence of the PAYF model on WUC's, their successful functionality and existence is key to the model's implementation and sustainability.

As mentioned, access to spare parts and supply chains is generally a challenge in Uganda. Private sector involvement is also a critical component for improved water service delivery in Uganda. However, private sector involvement should not be driven by profit mechanisms alone. There is a need for strong support mechanisms and supply chain links. Hand Pump Mechanics Associations (HPMA) in Uganda have identified the lack of spare parts and tools as a major challenge; even if this is not an issue in Kabarole, it could emerge as a problem if the PAYF model is scaled to new locations (Nekesa & Kulanyi, 2012).

HPMA's need the support of political leaders in the district to stimulate willingness to pay, especially in communities marked by low willingness/ability to pay and high levels of poverty. They also need financial support from the district to perform preventative maintenance work, especially when user fees are not enough to cover it. In addition to the primary market of rehabilitation and preventative maintenance of hand pumps, secondary markets should be encouraged for HPMA's in Uganda (Magara, 2014) which could include sanitation and rainwater harvesting.

The need for a good working relationship between WUC's and HPMA's (Nekesa & Kulanyi, 2012) is also cited, and the need to strengthen WUC's to fulfill their roles for governing water points in communities. In the past, WUC's in Uganda have experienced difficulty contracting HPM's and holding them accountable for their work and services (Nekesa & Kulanyi, 2012). It is observed that with the establishment of associations of HPM's in Uganda, the difficulty surrounding this relationship has been partially mitigated. There is substantial evidence that associations of HPM's strengthen accountability (Nekesa & Kulanyi, 2012). This relationship between WUC's and HPMA's could be an area for follow-up from IRC or the Learning Alliance.

WUC capacity building is essential. One way this could happen, for example, is for district local governments to provide information to guide tariff setting and encourage tariff payments. Water user fees and district level funding also need to increase in Uganda for HPMA's to have any significant impact on functionality rates (Magara, 2014). This leads to the critical issue of financing and cost recovery.

Full cost recovery is important for the viability of any model, and requires matching all costs with available sources of funding (see Figure 1 below). Life cycle costing is a common approach for achieving full cost recovery, though it often has overlooked components. For example, it generally doesn't consider the costs of local government engagement and capacity building, which are key to effective rural water service delivery. Political influence and interference have a substantial impact on water payment and financial viability for water service delivery models, and is an area to be leveraged. Political figures have the power to influence communities about the importance of paying for water service delivery, and to therefore contribute to financial viability and sustainability (Cardone & Fonseca, 2003).

Aside from local government engagement and capacity building, there are other costs that are generally ignored, not all of which are monetary. These can include environmental costs, economic costs and opportunity costs. All these costs should be considered when balancing cost recovery. **Table 2** provides insight to the various costs associated with service provision (Cardone & Fonseca, 2003).

According to IRC, the top five barriers to successful cost recovery for water systems under community-level management are: political interference; low or variable income; distrust of the cost collection system; insufficient willingness to pay; and lack of management transparency (Cardone & Fonseca, 2003). However, cost recovery is also made difficult by high levels of unaccounted for/unbilled water. As discussed in the "Data trends and observations"

section of this report, water points operating under PAYF are currently experiencing extremely high levels of unbilled water, with little understanding of the reason for it. Related to this, meters must be properly maintained and cared for – they are a critical component of cost recovery (Cardone & Fonseca, 2003).

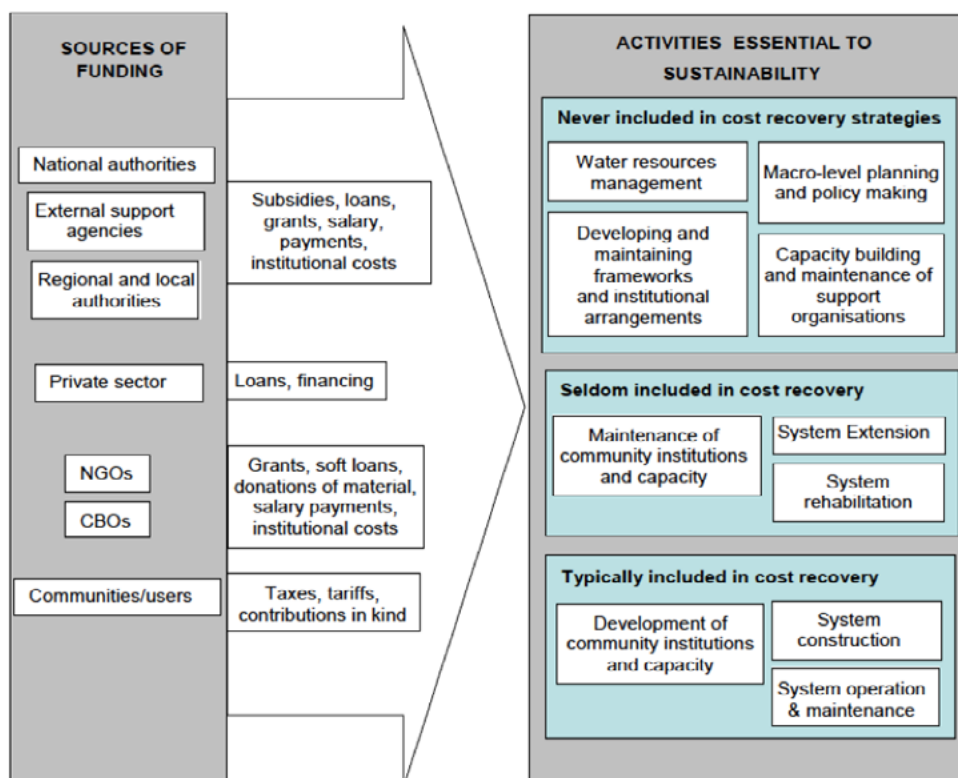


Figure 1: Full cost recovery, Financing and Cost Recovery, IRC (2003)

Total costs of service provision

Financial costs	Economic costs	Costs of sustaining the service
<ul style="list-style-type: none"> • Operation and maintenance costs • Capital costs • Servicing capital costs 	<ul style="list-style-type: none"> • Environmental costs • Opportunity costs 	<ul style="list-style-type: none"> • Institutional capacity building and skills training • Monitoring and assessment • Policy and enabling environment

Table 2: Various costs of service provision, Financing and Cost Recovery, IRC (2003)

As seen in Figure 1, sources of cost recovery can include multiple options: official development assistance (ODA), tariffs, subsidies, microcredit, social development or community funds. When a model depends largely on tariffs for cost recovery, willingness and ability to pay are critical components. Tariff structures can be insufficient for capturing costs within the system, and often exclude the poorest of the poor. This point is often overlooked, but for SDG6 to be achieved, everyone must be reached, and tariffs must take into account those who are unable to pay. There are many options for using tariff structures to meet the different needs of communities (Cardone & Fonseca, 2003). Tariff structures can be made flexible, and linked to consumer type or consumption level (Cardone & Fonseca, 2003). Flexible billing cycles can also be used; farmers, for example, are often more able/willing to pay right after the harvest.

Tariffs in developing countries are generally set well below the level needed to cover even operation and maintenance costs (Cardone & Fonseca, 2003). There are several options for tariff structures - PAYF in Kabarole currently operates under the "constant volumetric tariff," under which all consumers pay the same amount based on volume of water fetched. "Increasing block tariffs" charge user fees based on consumption level, with a certain amount of water given for a set price, but with the tariff increasing for increasing levels of consumption (Cardone & Fonseca, 2003). A similar tariff to this, the "lifeline/social block tariff" structure, provides a basic level of consumption for a very low cost or for free (which could help provide water to the very poor), with the tariff increasing or beginning for

any consumption level higher than this base amount. A progressive tariff structure, but one that can be difficult to implement, is the “output-based tariff” where users pay in exchange for improved service and based on a schedule of improvements promised by the water supplier. This system could be readily understandable to consumers, who can literally see the direct benefits of their payments. Seasonal tariffs can also be used, and are implemented in places like Chile where the tariff is based on the season: a higher tariff in the dry season when demand is high, and a lower tariff during the rainy season (Cardone & Fonseca, 2003).

In a thematic overview paper on cost recovery, IRC stated that “output-based subsidies could help with the transition from an existing tariff structure to a much more up-to-date and reasonable tariff structure.” Cross subsidies, where higher income consumers are surcharged in order to assist cost coverage to lower income consumers, are another option for making tariffs affordable for all.

Conclusions and recommendations: moving forward with PAYF in Kabarole District and beyond

The study highlights the importance of data collection: both continuing and improving existing data collection, and expanding data collection to further explore PAYF’s viability and success. With only four months’ worth of collected data, it is difficult to draw meaningful conclusions or recommendations from the data alone. A specific example of this was provided in the “Data trends and observations” section: data is being collected robustly on breakdowns, including service down-time, parts replaced, and cost for parts and for labour. If many months of data had been collected and it was noticed that a certain part of the pump is continuously breaking down at the majority of hand pumps, further investigation could help understand why, and an appropriate intervention introduced to address this. However, continued analysis will draw out trends over time, which will provide valuable insight and recommendations beyond the scope of this report. This section outlines general conclusions and recommendations from the analysis to indicate PAYF’s potential for Kabarole District.

Improving data collection

Of the 16 communities for which data is currently being collected, PAYF tariff collection is only successfully operating in six. Three more communities have tariffs collected for one month during the collection period. However, no data is being collected on the “why.” Future data collection should include a qualitative component in addition to the current quantitative component. If a hand pump is determined to no longer be operating under PAYF (enforcing and collecting tariffs from the hand pump), the data collector could try to determine the specific reasons for this failure, remembering that the failures could be technical/design related (such as difficult pumping or low yield at the source). If PAYF is to be implemented as an action-research experiment, this type of data would improve understanding of the model and the systems within which it operates. When interviews are conducted, questions should be posed in an open-ended manner, allowing free conversation that could uncover valuable information. For example, it was determined in Kanyamyegodi through discussions that the hand pump was very difficult to operate, causing people to avoid using it. This type of information can help identify practical solutions.

There is also scope for improving current data collection. As stated in the desktop review, “monitoring and evaluation for effectiveness at the system level is often inadequate, which means that problems are not corrected in a timely way.” Water meters should be reset if they are too high, as some of the water meter readings appeared to be invalid, probably due to not being reset once they had reached the maximum amount of numbers (99999). It could be helpful to pose follow-up questions to communities and/or caretakers at water points that are no longer operating under PAYF. It could also be useful to know of any breakdowns or pump failures; whether funds are being collected or expenses paid; and which stakeholders have visited the site. While this information is collected at successfully operating hand pumps, it is not collected at those which have failed under PAYF.

Additionally, more robust information from the water point caretakers would be helpful; for example, for determining why so much water passing through the meters is not being paid for. This could be due to water wastage (pumping before and/or after the jerrycan is placed under the spout); free water given to community members (as mentioned in the case studies); and/or use of different size containers. Current data collection methods do not enable analysis of causes. Caretakers could also track the number of jerrycans fetched per day (since this figure must already be calculated for payment collection), and the number of times or amount (if possible to record) of free water given out per day/week. An intervention to reduce water wastage from the hand pump could be appropriate, if it is determined that this is a significant contributor to the gap between meter readings and funds collected. In the future, a “water kiosk” approach could even be considered, where individual users buy credits that are put on a card (even a piece of paper), which would allow tracking per family/household and would provide further insight into consumer types that are using the water point.

Tariff structure experimentation

One idea mentioned in the caretaker interviews and case studies is charging different amounts based on consumption, or based on consumer type. Tariff structure options could be explored that still operate on a PAYF basis. A few of these were mentioned in the “Desktop review” section, as ways to improve tariff payment and collection. For example, “output-based tariffs” could improve willingness to pay by directly demonstrating to consumers how funds are used, and a “lifeline/social block” structure could address the need to meet the needs of people living in extreme poverty. Seasonal tariffs, though uncommon, could also address the challenge of seasonal variability of willingness to pay for water.

Regarding the vulnerable and those living in extreme poverty, it is important to remember that under SDG6, everyone must be provided safe water by 2030. Tariffs must be able to account for those who are unable to pay, and willingness to pay should be assessed, rather than assumed (Cardone & Fonseca, 2003). This concern must be addressed meaningfully; while PAYF offers potential for sustained service delivery at the community level, it also threatens to leave behind the most vulnerable. Subsidies and community/social development funds could ensure that the needs of those living in extreme poverty are met. For example, the income generated from charging higher tariffs to certain consumer types, such as bulk users or high-income consumers, could enable the charging of lower or no tariffs to those unable to pay.

Stakeholder engagement

Stakeholders in the PAYF model include IRC, HPMA's (namely KAHASA), WUC's, community members, subcounty/district government officials, and political leaders. The relationship between WUC's and HPMA's is an important one that could be an area for follow-up by the Learning Alliance/IRC. In addition, one way of addressing willingness to pay within communities could include active engagement with political figures and subcounty/district officials. From the small amount of data collected, none of these officials visited the hand pumps frequently, though subcounty officials visited far more often than district officials or political leaders. Greater efforts should be made to engage these stakeholders. Political figures could play a significant role in influencing the perception of payment for water and its value to communities by raising awareness through speeches, campaigns and other public engagement. District officials could increase the viability of HPMA's and provide funds to compensate for the lack of tariff collection in communities where PAYF is not performing well. This was discussed in more detail in the “Desktop review” section.

Cost recovery analysis

If data collection improves, including more robust financial tracking, a more detailed and thorough cost recovery analysis would be advisable. One reason for doing this is that it appears that hand pump mechanics could be incurring unnecessary costs that should be borne by communities. KAHASA members have reported not always being paid for their routine maintenance services, and sometimes lack the funds to repair hand pumps when communities have not been collecting fees properly. IRC has extensive experience with cost recovery and life cycle costing, and could recommend relevant tools to apply to the PAYF model: determine what costs are involved, who they are incurred by, and what methods for cost recovery are currently being used. Alternative methods for cost recovery, such as subsidies or social development funds, for example, could be explored for their potential to improve cost recovery. However, this recommendation is only appropriate if a full cost recovery analysis is applied to the model. This would require more robust financial data reporting and collection by communities, and all other parties involved in the PAYF model, to determine exactly how money is flowing through all water points operating under the system.

Additional research

Further desktop review could continue to influence PAYF and its future implementation. This could examine possible tariff structures and improved methods for tariff setting and collection. It could also include further literature review on cost recovery methods and best practices. Additional desktop research would provide the background and knowledge required to study some of these recommendations more closely, such as tariff structures.

Capacity building

Lastly, based on feedback from caretakers and WUC's, training and further capacity-building is recommended for caretakers. Areas of interest suggested during the interviews include record keeping, financial management, and community training on best practices for pumping. It is recommended that these are followed up on with other water point caretakers (since only a few were interviewed) and potentially WUC's also. Considering the importance of WUCs, feedback could also be solicited from committee members at different sites operating under PAYF, and training provided for them, as required.

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Appendix A: Case study on three water points operating under PAYF

Mukumbwe hand pump: interview with caretaker, Miriam

At the hand pump in Mukumbwe, a 20 litre jerrycan of water costs 50 Ugandan shillings, the equivalent of roughly 1 cent, or \$0.01, in USD. Miriam is the waterpoint caretaker and she feels that the waterpoint is a great success; she enjoys the role. The process of appointing the right caretaker can be tricky but the position does not need to be constraining. Because Miriam is also a school teacher she appoints someone in her household to manage the tap when she is not around to ensure that water is always available. Community members can fetch water at any time of day, though it is locked when not in use.

For the most part, community members pay for water without complaint, although a few people still say that water should be available to the community for free. There is only one person in the community who formally doesn't pay for water: the waterpoint's landowner. This was agreed by the community at the start of pay as you fetch (PAYF) implementation, and records are kept on how much water she consumes. Some other community members, including the elderly, school children, and passersby collect small amounts of water for drinking without paying, though these instances are not recorded.

Funds collected are saved in a bank account through Post Bank and deposited by the treasurer at the end of each month. This money primarily pays for: routine servicing by Kabarole Hand Pump Mechanics Association (KAHASA) at a rate of 30,000 shillings each time (less than \$8 USD); routine cleaning by a community member; and for the caretaker, who receives 30% of the funds collected each month. The funds are also used to buy new padlocks when they are vandalised or wear out. A challenge faced by those who govern the waterpoint is the seasonal variation of water consumption. The low level of funds received during the rainy season often reduces incentive and motivation for those who take care of the water point, as their pay drops significantly at these times.

In Mukumbwe there is an informal system for those who are unable to pay at the time of fetching water where they can pay the caretaker when money is again available. The community does not have many alternative ways of fetching water except the National Water and Sewerage Corporation (National Water) which has set up a kiosk nearby. However, their services are not provided 24/7 and customers have frequently complained about the water being of poor quality. It is also more expensive than at Miriam's hand pump; people say they prefer fetching water from her.

Many bulk users utilise the services of the water point, including brick makers, farmers, and construction workers. These users will frequently take upwards of 100 jerrycans of water at a time; according to Miriam, they may be willing to pay a higher rate due to the large amount of water being consumed. Many community members are interested in household taps, and have enquired about the possibility of extending taps to their homes. Some have also expressed interest in paying a fixed monthly amount for the water instead of paying each time it is fetched.

Miriam did not receive any training prior to becoming a water point caretaker but said that she could benefit from additional training. She expressed interest in meter reading, basic hand pump mechanics, record keeping, and finance management. She felt that other communities experiencing poor adoption of PAYF and community-based management could learn from her community and its story of success.

Burungu hand pump: interview with caretaker, Kanyunyuzi Josephine, and Water User Committee chairperson

At the hand pump in Burungu, users pay 50 shillings per 20 litre jerrycan. Everyone in the community pays for water, and they all pay the same amount. The caretaker at the water point is Josephine, who says that the job has provided her with improved financial stability. She's the second caretaker this water point has had since the rehabilitation: the first caretaker had other responsibilities and not enough time to dedicate to the job. The community's Water User Committee is very active and Josephine has found them supportive. In fact, the committee's chairperson joined the interview and provided insight into the water point's functional status and context.

As in Mukumbwe, the elderly and passersby in Burungu can take small containers of drinking water for free. Community members do not always fetch water in 20 litre jerrycans, often bringing larger containers and demanding to pay the same amount for a larger volume of water. As with Mukumbwe, the water taken for free is never recorded. The number of jerrycans sold per day is also not recorded: Josephine simply records the amount of money collected at the end of each day.

Burungu has several bulk users, primarily brick makers, farmers, construction workers, and crop sprayers. At one

point, the idea of charging bulk users a higher rate was considered but then abandoned due to competition from nearby National Water kiosks. These kiosks are more convenient than the hand pumps as they require less physical effort and time. The competition from National Water seems to be causing concern at this water point, although the magnitude of the problem is difficult to gauge.

Funds from this water source are saved in a bank account. The community is exploring the possibility of using the funds to improve latrines by purchasing sato pans (upgraded durable plastic toilet pans) which can minimise odors and germ transmission. KAHASA undertakes monthly maintenance services for a set fee of 30,000 shillings (\$USD 8). As with Mukumbwe, the caretaker is paid monthly as a percentage of the funds collected, which varies according to the season. The local Water User Committee (WUC) chairperson expressed concern about misuse of the handpump, which needs to be addressed to minimise levels of servicing.

There was some vandalism at the water point initially but this subsided once the hand pump became a common feature. There are still water losses resulting from people fetching large amounts of water that is not paid for; continuing pumping after their jerrycan is full, and starting to pump before placing their jerrycan under the tap. In response, both the caretaker and committee chairperson suggested a practical session on best practices for using the hand pump. Josephine and the committee chairperson also commented that they had received no prior training, but would be interested particularly in improving their record keeping.

Kanyamyegodi hand pump: community interview, led by Kabahuma Majiri

Unfortunately, not all PAYF stories in Kabarole are positive. The hand pump in Kanyamyegodi is non-functioning after a recent breakdown and has scarcely operated under PAYF. When the system broke down there was no money to pay KAHASA for servicing. KAHASA has known of the community's difficulties for a while, having played a longstanding role with them as part of the initial PAYF pilot process in Kabarole. They believe many of the problems pertaining to unwillingness to pay in Kanyamyegodi stem from politicians reinforcing the notion that water should be free and making empty promises to provide free services.

Even when water tariffs were being collected in Kanyamyegodi - which last happened in March 2018 - very few people actually paid. There was no formal system for deciding who received free water, although water was often given to children, the elderly, the poor, the sick, and agricultural users for irrigation, for instance. Few records were kept on water usage and funds collected through tariffs. The caretaker has never been paid, and at the time of this interview, was not even available to provide input, having left once the water point failed. This interview was therefore conducted with several community members who were present at the site.

During the interview a heated discussion arose between KAHASA and the community members who insisted that the system be repaired, but were unwilling to pay for the repairs. Since KAHASA is a business relying on payments for their services, they are unable to work for free. Community members have even reached out to private contractors about fixing the hand pump, implying that relations with between KAHASA are strained.

Community members generally regarded service delivery at this handpump to be of poor quality, even when the system was functional. Many said they stopped using the hand pump because it was too difficult to operate and took too long. Water leakage was a common problem, and there was often no water available at all. There is also a local water vendor with his own hand-dug shallow well in Kanyamyegodi, who charges higher rates (1000 shillings per jerrycan, as opposed to 25 shillings per jerrycan at the hand pump). Since people can get water quickly and easily from this vendor without having to pump, some are willing to pay the higher price for convenience, despite the health risks that are inherent when fetching water from open, unprotected sources.

Others in the community retain their strongly-held beliefs that water should be free and collect water from alternative sources such as a nearby stream. Interestingly, many of these people admit to knowing that this water is unsafe for consumption. Others argue they cannot afford the water tariff.

Another hand pump that has had no success operating under PAYF exists nearby, in the community of Kabisokoro. The hand pump has never operated under a tariff scheme, though it is still functioning and has never broken down. A community member at this site mentioned that many people from Kanyamyegodi walk to Kabisokoro to use the free water there. Unfortunately, no caretaker was available to talk about Kabisokoro's hand pump during the site visits.

The WUC chairperson was present during the community engagement and even provided his contact information for follow-up. Unfortunately, the WUC in this community failed to enforce the bylaws laid out in the initial Memorandum of Understanding (MoU). Community members at the site said they wanted their hand pump fixed and were willing to pay to keep it working. However, they have said this before and failed to follow through. This situation is likely to continue if it is not addressed in future interventions.



(Left) Broken handpump at Kanyamyegodi. (Right) Stephen Balyabuga of KAHASA talks with the Burungu Water User Committee Chairperson (Photos by Caleb Cord)

Appendix B: Water point caretaker survey

1. What is the cost of a 20L jerry can of water at this water point?
2. Does everyone pay the same amount for the water? Does anyone pay anything other than shillings for the water (such as work, favors, fruits or vegetables, etc.)?
3. Is there an active Water User Committee in place that governs this borehole?
4. How is your relationship with the Water User Committee? Do you experience challenges?
5. Has there been a change in caretakers at this water point since the rehabilitation?
6. Since it has been rehabilitated, have there been any days when the water is not flowing? What was the reason for this?
7. What types of community members are given free water at this water point?
 - a. All children
 - b. School children
 - c. Elderly
 - d. Water point land owner
 - e. Very poor
 - f. Other:
8. If some are given free water, do you record how many jerrycans are given out for free each day?
9. Do community members complain about paying for water? If so, what do they say?
10. Are community members more willing to pay for water during certain times of the year than others?
11. What desires have been expressed by the community for use of the money that has been saved? (such as loans for business, paying school fees, etc.)
12. What do you use the money for that is collected from water tariffs? Please specify all things which are paid for, in addition to the options below.
 - a. Payment to KAHASA for O&M
 - b. Payments to Water User Committee
 - c. Payment to the caretaker
 - d. Other:
13. Do you subscribe to KAHASA's services for Operation and Maintenance? If no, why not?
14. (If water point indicated failure for a particular month) What reasons caused the water point to fail for the month of _____?
15. (For water points that alternate between PAYF and no payment for water) Why did this water point operate under PAYF during some months, but not during others? Are people still collecting water when PAYF is not in place, without paying for it?
16. (When a system was down for longer than a day at any point during the collection period) What was the

reason for the long down time?

17. Have you experienced vandalism at this water point?
18. Do you keep records of how many people have visited the water point each day, or how many jerry cans have been paid for each day?
19. Is there an official bank account for the funds (such as a Post Bank account)? If no, why? Where is the money stored, and who manages it?
20. Do any commercial or industrial users use this water point, such as local businesses or successful entrepreneurs? How much water do they collect each time?
21. Did you receive any training prior to becoming a water point caretaker?
22. In which areas could you use additional training, if it were to be provided by IRC?
23. Do you have any other questions or concerns about the PAYF process?
24. Do you enjoy being a water point caretaker? What has changed in your life as a result of obtaining this position?