Mobile Payments Over Time (M-POT) Implementation Plan

Jill Luoto, PI

Project End Goal

The goal of our project is to implement and deliver findings from a 300-household randomized controlled trial to test the M-POT sales plan for ceramic safe water filters in Kenya. The implementation plan herein describes how we will achieve our goal on time, on budget and to USAID expectations.

Project Description

M-POT is a joint project between RAND and the Safe Water and AIDS Project (SWAP). RAND will provide oversight and perform all data analysis as well as write up project findings, while SWAP will be the local implementing partner for this study. RAND will be the point of contact for USAID. M-POT involves SWAP salespeople visiting 300 households during door-to-door sales visits through 20 neighborhoods surrounding 6 SWAP satellite offices.

Safe Water and AIDS Project (SWAP) is a Kenyan registered NGO, operating in Western Kenya. SWAP's mission is to improve the quality of life of the vulnerable community by building their capacities and supporting them to develop profitable health-oriented micro enterprises.

SWAP has established in the communities *Jamii* centers (*Jamii* is a Swahili word for Community), managed by well-trained community health promoters, who provide health promotion and door-to-door sales of health and hygiene products, commonly referred to as "the basket of goods." One of the products promoted and sold is the Cera Maji filter, a silver enhanced ceramic filter which is locally produced and well accepted by the community and a user-friendly way to provide safe drinking water. However, barriers to adoption of these filters include the relatively high price in comparison to the other health products in the basket of goods as well as unfamiliarity with the product. Kenya is a global leader in the adoption of mobile phone banking (Mpesa), even among the rural poor. For MPOT, SWAP will do research on an improved sales offer, which will include a free trial of the filter and installment payments using Mpesa mobile banking.

For this purpose SWAP has set up a Paybill Account, which will monitor the payments. Clients will be reminded about payments and provided health messages through SMS telephone messages using Frontline SMS. The proposed study area will be Nyando and Nyakach, neighboring districts of Kisumu where SWAP's headquarters is situated and in an area, where SWAP has done previous research and set up a SWAP model village (demonstration village) with training facilities and a *Jamii* Center. SWAP has known the local leaders and representatives of the Ministry of Public Health and Sanitation and Medical Services who are all supportive of the research and implementation activities and who recognize SWAP as one of the key partners.

In partnership with RAND SWAP will perform a randomized trial on 300 households offering half (150 households) the improved sales offer of free trial and installment payments and the other half a "traditional" sales offer of instant cash payment upon delivery of the product.

Benefits from Project

The immediate benefits from our project will accrue to the subset of the 150 households assigned to the treatment group who accept the terms of the M-POT sales offer to purchase safe water filters to make their drinking water safe. The ultimate benefit from our project will be to generate knowledge whether M-POT sales offers can increase the numbers of poor Kenyans with access to a preferred form of water treatment that is often beyond their reach under traditional sales offers. If so, the benefits of our project could expand greatly to help address the hundreds of millions who live in areas without access to safe drinking water yet with access to mobile phones and mobile banking services.

Deliverables

The deliverables included as part of this project have been laid out in our project milestones submitted to USAID. They include:

- This implementation plan
- Two month progress report documenting: the number of SWAP saleswomen trained into the novel sales offer (M-POT) and the number of identified samples for the evaluation of the sales offer including a description of these areas. In addition, we will describe to USAID any identified barriers and/or facilitators to project implementation experienced thus far in order to help identify potential for scalability of the project should findings warrant.
- Four month progress report documenting: The number of households on which M-POT has been pre-tested; cumulative number of households study has been executed on including preliminary results; cumulative progress indicators based on data analysis. In addition, we will describe to USAID any identified barriers and/or facilitators to project implementation experienced thus far in order to help identify potential for scalability of the project should findings warrant.
- Six month final report documenting: cumulative number of households the study has been executed on, including results; progress indicators achieved since project start, based on data analysis, and the preliminary data. We will summarize for USAID our findings from the project as well as discuss any identified barriers and/or facilitators to project implementation experienced.

Implementation Schedule

To ensure successful project implementation delivered on-time we have developed the project schedule below.

Project Timeline: August 29, 2012 – February 28, 2013

No.	Activity	Associated Deliverable:	Months					
			Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13
1	Train SWAP saleswomen into novel sales offer	2-month progress report						
2	Select study area and samples for evaluation of sales offer	2-month progress report						
3	Pre-test sales offer on few households	4-month progress report						
4	Execute study on 300 households	Preliminary findings in 4-month progress report. Complete findings in final report.						
5	Analyze data	All deliverables will have cumulative data updates						
6	Prepare draft report	Incorporated into final report						
7	Present draft report to clients and stakeholders							
8	Prepare final report	Final report						
9	Search for scaling partners and funding							

Two-Month Progress Report: "M-POT: Mobile Payments Over Time" (formerly titled, "Increasing Access and Use of Safe Water Filters at Scale")

Jill Luoto, PI

This document records our project's progress so far and details the immediate next steps to be followed.

Our project is well underway. Most importantly, we have secured IRB approval for our project to begin formal data collection and SWAP has hired a full-time project manager for M-POT, Frederick Koga (Fred). Fred has been busy managing the day-to-day operations of M-POT, help in training SWAP vendors who will double as enumerators for the quantitative data collection, and conducting some initial piloting and formative activities for M-POT. Fred has conducted field site visits and informant interviews with households that have already accepted the M-POT sales offer for the CeraMaji filters as a part of these piloting activities. He has been taking detailed notes of his activities and sending them biweekly to RAND.

In addition, a team of four UC Berkeley MBA students went to Kenya for three weeks as part of a summer field experience associated with their international business development course during summer 2012 and undertook some initial exploratory work for M-POT.

In this report we will summarize findings from Fred and the MBA students' field reports to provide relevant background material for our project, as well as summarize the overall progress of our project thus far. The outline of this report is as follows:

1. Background Market Research: Description of current local context with regards to water treatment products and behaviors
2. Summary of interviews and field site visits for M-POT households in piloting activities
3. Summary of interviews with SWAP saleswomen who have adopted M-POT payment plan in piloting activities
4. Description of planned sampling for quantitative study
5. Discussion of anticipated or experienced challenges and proposed solutions to ensure project success
6. Next steps and anticipated results

1. Background Market Research: Description of current local context with regards to water treatment products and behaviors

Water Sources

There are many different water sources used depending on both the region and the season. In Kisumu's urban areas, tap water is the most common source. In more rural areas, rain water is an important source during the rainy season, but rivers, lakes, and boreholes are frequently used as well (mainly in the dry season).

Water Treatment Products

In this area of Kenya there are multiple point-of-use (POU) safe water treatment products commonly for sale. In Table 1 below we briefly summarize the available products and their key characteristics. Some products, such as WaterGuard (a chlorine-based product), are better known than others, likely due to the fact that it has been on the market the longest, and due to the heavy levels of social marketing and brand awareness by PSI and other NGOs that work in this area.

Table 1: Safe Water Product Options

Product Class	Brand name	Mechanism of treatment	Manufacturer	Unit	Effect (Per unit)	Retail price (Per unit)
Consumable	PUR	Chemical flocculation and disinfection	P&G	4g per sachet Powder	10 L per sachet	KSh 5 / US$ 0.06
Consumable	Aquatabs	Chemical disinfection	Medentech (Irish company)	5 strips of 10 tabs; Tablet	20 L per tablet	KSh 20 / US$ 0.24
Consumable	WaterGuard	Chemical disinfection	WaterGuard	150 ml Liquid bottle	20 L per dose[1]	KSh 20 / US$ 0.24
Durable	CeraMaji water filter	Ceramic filter	Kenya Ceramics	1 filter	8.5 L per pot	KSh 1,300 / US$ 15.60
Durable	Chujio water filter	Ceramic filter	Chujio Ceramics	1 filter	8.5 L per pot	KSh 1,700 / US$20.40

WaterGuard is also among the most cost-efficient water treatment products or methods, with an estimated 3-year cost of 720 Kenyan Shillings (Ksh; about $8.50) and 6-year cost of 1440 KSh for a typical family size and level of water consumption (assuming a simple rule-of-thumb that one bottle lasts a typical household for one month). The CeraMaji ceramic filter (the featured product for M-POT), has a 3-year cost of 1300 Ksh, and a 6-year cost of 1900 Ksh (to replace the ceramic bowl, estimated to last for 3 years), making it more expensive than chlorine, but less expensive than PUR, which has an estimated 3-year cost of 5,400 KSh and 6-year cost of 10,800 Ksh (assuming 1 sachet per day).

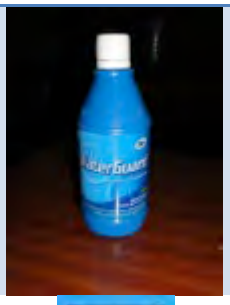
Informal interviews with SWAP vendors suggest that in urban areas of Kisumu there is relatively high awareness of the importance of treating one's drinking water, and people are more likely to use WaterGuard from among the available options when they do treat their water. In rural outlying areas, there is believed to be lower overall awareness of the need to treat one's drinking water, but nonetheless quite a few households are aware of its importance. SWAP attributes this to the longstanding efforts by itself and other NGOs in the area to educate the population.

[1] Waterguard dose is 1 bottle cap for water without residuals and 2 bottle caps for water with residuals

Despite this awareness, our project's formative field work, as well as previous work by team investigators and others, has often found low and inconsistent adoption rates of any safe water treatment method in this part of Kenya. The same is true for much of the developing world that lacks access to safe drinking water sources. This suggests that people may be dissatisfied with many of the water treatment methods currently available. There is also evidence from this part of Kenya and elsewhere that households often prefer a filtering product when made available, but that the price of filters is prohibitive for many. This is the central motivation for our project.

We briefly summarize customer opinions of the products that compete with the filter based on formative field work in the following table 2.

Table 2: Customer Competing Product Reviews

Treatment Method	Picture	Customers Opinion
WaterGuard		• Most Popular • Easy to use: It is not necessary to stir • Efficient • Cheaper than PUR and Water Filters • Powerful brand recognition[2] • Smell and taste is a complaint of some customers • Some customers pointed that they get confused about when they should use 1 or 2 bottle caps as the dose
PUR		• More expensive • Process is longer and demands more effort than WaterGuard • Good when water is turbid
Aquatabs	Aquatabs water purification tablets	• Not as popular, but one of the customers interviewed was using it and considered it simpler than other options
Boiling		• More common among very poor population • Free (if abundant fuel (wood) available) • Customers admit they do not always boil because time is an issue

CeraMaji Filter Production and Market Characteristics

For this project we will feature the CeraMaji filter. SWAP originally sold the Chujio filters, but has switched to CeraMaji due to its lower price. The two filters function identically, but Kenya Ceramics – the manufacturer of CeraMaji - is located in Kiminini, closer to Kisumu (SWAP's headquarters), which decreases transportation costs for SWAP relative to the Chujio filter.

[2] Although WaterGuard competes with Aquatabs which has exactly the same formula and is cheaper, customers prefer to buy WaterGuard because of its strong brand recognition.

Kenya Ceramic is a non-profit organization associated with an umbrella project called Innovative Canadians for Change, created at the University of Alberta in Canada. According to an interview with Kenya Ceramics' Marketing Manager, Mr. Karanja, there is capacity to produce 6,000 filters per month and they are currently producing 1,200.[3] However, a February 2012 article in Canada's "The Globe and Mail" newspaper reported they were producing 400 per month.[4]

CeraMaji's retail price of 1300 Ksh includes a 150 KSh profit margin for the SWAP salespeople. The wholesale price of the filter (for SWAP) is 1150 KSh. It is unclear at present by how much and whether this price might decrease if production and sales volume were to increase considerably if this project were to scale.

Ceramic water filters like CeraMaji are difficult to find in the supermarkets and stores of Kenya. One reason for this appears to be hesitancy on the part of shopkeepers to store the filters due to the large necessary shelf space. This fact helps to explain the lack of awareness about the product among the population. But there are other types of water filters in the big supermarkets in cities, all of them more expensive than the ceramic ones with prices ranging between KSh 2,250 (US$ 27) to KSh 8,995 (US$ 108).

2. Summary of interviews and field site visits for M-POT households in piloting activities with CeraMaji

Early findings from the field suggest that customers who already have ceramic water filters are very satisfied with the product. They like that it does not leave a smell or taste in the water as WaterGuard does, and that it does not demand as much effort as PUR or boiling. They also like that the filter doesn't represent a direct addition of a chemical product to the water and that the ceramic filter reminds them of the ceramic pots traditionally used to store water. Nevertheless, there are some complaints related to the capacity of the filter. Although the bucket can hold 20 liters, the filter can be filled only with 8.5 liters at each time because of the capacity of the ceramic bowl. For those that don't have the filter yet and are aware of the product, its price is the main reason stated to not have acquired the product. Considering that monthly income is normally close to KSh 2,500 (US$ 30), it is understandable that the population has difficultly affording a product that costs KSh 1,300 (US$ 15).

In September, Fred visited nine households that had previously purchased the CeraMaji filter via the M-POT payment plan as a part of our piloting activities. He reports that all nine households had water in the filter at the time of his unannounced visit. Fred has also visited surrounding areas of SWAP village offices to scope out potential sampling sites for inclusion in our quantitative study. During these scoping visits he encountered more households who had been given access to CeraMaji through other NGO

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[3] Interview was undertaken 4/29/2012 by UC Berkeley MBA students who went to Kenya for three weeks as part of a summer field experience associated with their international business development course and undertook some initial exploratory work for M-POT.

[4] http://www.theglobeandmail.com/report-on-business/small-business/sb-growth/sustainability/how-the-ceramaji-water-filters-are-made/article2345324

programs in the area. We will describe these programs and our subsequent plans for sampling in greater detail below, but here we summarize findings from these interviews with CeraMaji customers.

The 9 households from SWAP's pilot activities cited the following benefits of the CeraMaji filter:

- Water is very clean and safe for drinking;
- There were very minimal cases of diarrheal illness after they started using the filter;
- The filter makes turbid water very clear;
- The filter helps conserve on the use of fuel as compared to boiling of water for drinking;
- The filter is easy and convenient to use;
- Children cannot dump their fingers into the filter if well stored and covered. This is in comparison with pots which children open the lid to collect water for drinking;
- One client mentioned that it makes water retain its natural state of odourlessness, unlike chlorination which leaves the smell;
- One client also reported that the ceramic smell makes him like its water for drinking.

These households also reported the following challenges associated with the Cera Maji filter:

- They cited the cost as the greatest challenge that deter many people from acquiring a filter;
- Households complained the filter has small water holding capacity and cannot adequately serve a larger family;
- Households complained the filter is fragile and prone to breakage if not handled properly;
- The filter seeps water at a slow rate, making it inconvenient in times of urgency (one customer complained of the filter seeping a lot of water; we replaced it with another filter).
- Households complained that CeraMaji does not keep water cold, especially during the hot season.

With regards to their experiences making installment payments towards the filter using M-PESA, we found:

- Eight of the nine households regarded M-pesa installment payments as the most appropriate way of purchasing the ceramic water filter;
- One respondent reported that she would like the payment to be made in cash installments and in person since through cash the client can negotiate about his/her financial status to the vendor;
- It is inconvenient if one has relocated to an area with no network and M-PESA services and the money is urgently needed;
- Lower income earners find it hard to afford the filter, even with the M-PESA installment payments.

Other Reviews of CeraMaji filters

World Vision

On one field visit Fred and other SWAP representatives visited the Katito Health Centre to meet representatives of the Ministry of Public Health and Sanitation. During this visit they had the opportunity to meet the Divisional Public Health Officer (DPHO) from Nyakach. He mentioned that the NGO World Vision recently distributed 81 CeraMaji filters for free to two villages in lower Nyakech as part of a program that is focusing on safe water and water treatment at households in areas with high incidence of diarrheal illnesses. The distribution was done by using community units to identify mothers with children below five years of age. This discovery prompted us to find more information concerning his experience with the CeraMaji filter; we also followed up by interviewing some of the households that received free CeraMaji filters under this program.

The DPHO believes the CeraMaji is highly accepted by consumers because of its impressive look. He said it is a prestigious product to some people since they take it as a status symbol. He also reported that people liked the CeraMaji because it keeps water cold, clarifies turbid water, and some holders also reported to him that it works well when it is clogged. He mentioned its fragility and prohibitive cost as the major barriers to the filter's adoption.

Following our interview we conducted a spot-check in four of the 81 households which were given free CeraMaji filters. At two households nobody was at home and their doors were locked. In a third household, there were no household heads available but the doors were open and the children directed us to the filter, but there was no water in the filter.

In a fourth household, the mother was present and showed us the filter. The filtering element itself was removed but the receptacle had water in it. We asked her why she was not using the filter, and she told us that water was not seeping out. We realized that this was because the filter had clogged due to accumulated dirt and mold, and they did not have the brush for cleaning. The CeraMaji filter is sold with an accompanying scrub brush for cleaning it, but many women like to use the included brush for washing clothes and other activities. This highlighted for us the importance of educating community members on the proper usage and maintenance of the filter as a part of SWAP's sales efforts.

Kenya Water and Health Organization (KWAHO)

On another scoping visit by Fred and other SWAP representatives to Nyando District, we spoke with the Divisional Public Health Officer at the Ahero Sub District Hospital, who reported that the Kenya Water and Health Organization (KWAHO) had donated 10 CeraMaji filters to three districts: Nyando, Nyakach and Muhoroni, which received four, three, and three CeraMaji filters, respectively. The public health officer was familiar with the CeraMaji and highlighted its many benefits relative to competing water treatment products:

- He said it is cheap to maintain;
- Requires no experience and knowledge to use;
- He also reported the CeraMaji filter reduces the salinity of water and has no "intoxication" as compared to chlorination as a method of water treatment;

- He cited its high cost as the greatest challenge that makes many poor households not able to afford the CeraMaji filter.

Other Piloting Activities

Fred has also spoken with SWAP vendors and different community groups and health facilities in the areas surrounding SWAP offices to gather more information about current water treatment behaviors and offer some the CeraMaji via the M-POT sales offer on an informal basis.

During the first week of October Fred visited a total of 40 women across different rural communities in Nyanza province. Of those 40, just 5 women accepted the M-POT sales offer for the CeraMaji. This rate of acceptance is much lower than our initial piloting activities found and we are still trying to uncover exactly why so many households refused the offer this time around. It has convinced the study team of the need to have a single coherent sales script with a clear description of the sales offer for the planned randomized trial, to ensure that households understand the terms of the offer, as well as a basic educational component about the importance of treating one's drinking water more generally, in case households are not aware of this need (as is unfortunately still common, especially in rural areas).

Of the 35 customers who refused the offer made by Fred, the vast majority cited lack of money as their reason for refusal, even despite the installment payments. Other reasons including women reporting current use of WaterGuard or other forms of water treatment. For this latter reason, it is not clear if these women are truly treating their water and consistently doing so, or if this was a polite excuse.

3. Summary of interviews with SWAP saleswomen who have adopted M-POT payment plan in piloting activities

Fred has spoken with SWAP saleswomen from the various SWAP satellite offices about M-POT and their experiences with it as a part of his project activities and in training these women into the sales offer. In addition, the UC Berkeley MBA students conducted some interviews with SWAP vendors during their field visit who also had been trained into M-POT. We briefly summarize findings from these interviews here in order to understand the "upstream" view of the vendors themselves, since selling products for SWAP is their primary form of income. We do not reveal their names in the interest of protecting their privacy.

Saleswomen interviews

All the interviewed vendors from the different SWAP satellite offices work as a SWAP vendor as their primary form of employment. They sell products to customers primarily door-to-door, visiting anywhere from 5 to over 10 households per day. Each vendor reported they generally oversee an area comprising roughly 200 households, and will return to households every few weeks. Some vendors also bring their products to market days and to church on Sunday as other methods of selling. Weekly sales can vary tremendously, from as low as 3000 Ksh per week in total revenue to upwards of 8,000 Ksh. All vendors reported that customers generally do not want to purchase the CeraMaji filter due to its price under a traditional sales offer. Some vendors also stated that they typically first will offer WaterGuard for sale and only mention the filter if the household says it does not like WaterGuard.

When asked about their new sales offers for CeraMaji using M-POT, the vendors reported mixed reviews. All the vendors reported it was easy to collect the mobile phone information from customers (some vendors report that they share mobile phone information with customers already in order to accept orders in advance of their visits). Most vendors say they experienced an increase in filter sales under this plan. However, some vendors did not like the M-PESA installment plan themselves because it delayed their own commission schedule. In addition, vendors would like to know when a payment is made, but currently this information only goes to the central database overseen by Fred. They requested SMS notification of such payments by their customers.

4. Description of planned sampling for quantitative study

Our sampling design has taken shape over the past month. We plan to sample the 300 households for inclusion in our cluster randomized trial of the M-POT sales offer across five SWAP offices in Nyanza and Western provinces as follows.

a. Kisumu (Head Quarters) – 30 households Novel sales + 30 households traditional sales
b. Nyando SWAP Model village and Field Office – 30 households novel sales + 30 households traditional sales
c. Homa Bay Field office and Jamii center (community center) – 30 households novel sales + 30 households traditional sales
d. Siaya Field office– 30 households novel sales + 30 households traditional sales
e. Kakamega Provincial Office – 30 households novel sales + 30 households traditional sales

The Kisumu, Homa Bay, Siaya and Nyando sites are all situated in Nyanza Province with populations mostly of the Luo tribe. These areas are generally very close to Lake Victoria. Kakamega is in Western Province and is predominantly comprised of Luhya population. This area is further from the lake and is likely to contain more subsistence farmers and owners of small scale businesses. Kisumu, Kakamega and Homabay have urban, periurban and rural settings, while Siaya and Nyando have periurban and rural settings only. We are trying to ensure we will have a fair representation of both urban and rural settings.

In some areas in Kakamega and Nyando, freely provided LifeStraw filters have been widely distributed by Vestergaard Fransen. Our best field reports suggest that these filters are largely unused, however. Fred is in the process of learning more about this. There are also chlorine dispensers in many parts of Western and Nyanza provinces. We are relying on SWAP field officers to assist in identifying the neighborhoods without Vestergaard Fransen freely provided Lifestraw filters or areas without the chlorine dispensers in our sampling. Our primary reason for doing so is to maintain generalizability of our study's findings as much as possible. This is proving somewhat difficult in practice, however, and we may inadvertently sample households that have benefited from these other programs in certain areas. We will record such information and believe that our project can in many ways be complementary to these other programs, particularly if households are truly not using their LifeStraw filters and/or do not like or use the water source with a chlorine dispenser. We are collecting as much information as we can about how these programs are faring in order to compare them qualitatively with our own study's findings.

We are identifying four non-contiguous neighborhoods or villages within each of the five office catchment areas to total 20 neighborhoods for the study. From each of these 20 neighborhoods we will randomly select 15 households using a simple rule-of-thumb: a "spin the bottle" technique to select an initial household, and then we will select every fifth household until we locate 15 households that meet our screening criteria and consent to the study. We hope to cover a single neighborhood (15 households) in one day in order for information about our study and the sales offer not to spread among neighbors before we arrive at a selected household.

For our selection of individual households, the selection rules in all neighborhoods will include:

- The homes should be far enough apart that household members could not see the previous transaction (tentatively identified as every fifth household);
- An adult is home who has authority to purchase items;
- Woman (or man, if no woman available) has a mobile phone (or a family member has access and she/he can receive text messages from it);
- The woman has used or is willing to use M-PESA and Paybill.

Some homes in both traditional and novel offer neighborhoods will fail the screening criteria. SWAP staff are instructed to mark these households clearly in the data as not part of the study sample as well as the reasons why. They are then welcome to offer them the filter for cash, if it does not take much time.

5. Discussion of anticipated or experienced challenges and proposed solutions to ensure project success

Our formative work has pointed out some challenges that we hope to avoid as we begin to implement the formal randomized study of the sales offer. Moreover, this formative work has uncovered some challenges we can anticipate as we imagine what the project might look like at scale. These challenges include SWAP vendors having complaints about the sales offer from their own point of view, sampling difficulties to avoid areas with high penetration of competing safe water programs, complaints about the CeraMaji filter itself, as well as processing of payments and collecting of defaults as we think about how M-POT could scale.

In our original small pilot, SWAP vendors did not receive notification about payments made by their customers due to our use of separate software for tracking payments and sending SMS. SWAP has since installed Frontline:SMS Credit software as well as registered for a Paybill corporate M-PESA account. These new software should bring many improvements and in a few additional pilot households we are already seeing its benefits. First, the new Frontline:SMS Credit software allows for the sending and receiving of mobile money payments in the same software package as SMS messages sent in bulk. It also can allow for a third-party auto-notification of payments sent to the vendors via SMS. It also allows for the tracking of client payments toward a target and thus can allow for tracking progress toward paying off the filter, with automatic alerts to customers who fall behind.

The Paybill corporate M-Pesa account waives the transfer fees for the customers that they normally have to pay at the time of sending money. Also, since SWAP is a non-profit organization, it is given a

discount on these fees as a part of its Paybill account. These features significantly add to the potential scalability of our project.

The SWAP vendors' complaint about not receiving their full commission until the end of the payment period is understandable. This is an issue that may take care of itself, however, if M-POT increases their overall sales of filters considerably.

Another challenge as we think about the scalability of our project is that the pay-over-time model is only effective if customers can be tracked down upon default to reclaim the product. Currently, it seems that SWAP vendors are quite familiar with their customers and that there is also not much risk of relocation. However, were this model to be expanded beyond SWAP's normal distribution method, this may become a higher risk if vendors have to cover customers that they do not already trust or have familiarity with. Further, the M-Pesa method of collection is limited by knowing the mobile numbers of customers. If for some reason customers were to change their mobile numbers on a frequent basis, the payment system would become cumbersome and potentially ineffective. Yet this does not seem like a large current risk as customers tend to keep mobile numbers since they are tied to M-Pesa accounts used frequently for other purposes as well.

If during the course of our study we hear many complaints about the CeraMaji filter itself, we can think about switching to offering a new or different product such as a different filtering product or an improved Jiko cookstove to reduce indoor air pollution and is also offered for sale by SWAP vendors (and faces many of the same barriers to its purchase). We believe this is not likely to be a significant risk as the majority of reviews of the CeraMaji have been positive during our formative work thus far. However, our study is meant to be a test of the M-POT sales offer, and not of the filter itself. We are making a priority of recording customer complaints about product design to share with Kenya Ceramics and more broadly.

6. Next steps and anticipated results

We plan to begin formal data collection on the 300 household randomized study very soon, likely within the next week or so. We have secured IRB approval and identified our neighborhoods and sampling strategy. Our SWAP enumerators/vendors are trained into the M-POT system, and our surveys and sales scripts are finalized. We are ready to go.

We anticipate our project will document a measurable and significant increase in the rates of households that purchase a filter under the M-POT plan as compared to a traditional sales offer. We also anticipate our project will thereby increase the rates of households with access to safe drinking water, since the majority of households do not treat their water consistently with any competing method in this part of Kenya.

Four-Month Progress Report: "M-POT: Mobile Payments Over Time"

Jill Luoto, PI

Our project is in the midst of data collection.

In this report we will summarize the preliminary quantitative results from the study as well as discuss qualitative findings from MPOT's project manager Fred who continues to oversee operations and report from the field on a biweekly basis. The outline of this report is as follows:

1. Summary of field work implementation, progress, and remaining schedule based on Fred's qualitative reports plus weekly conference calls with SWAP's team
2. Analysis and discussion of preliminary quantitative results from the field thus far
3. Summary of challenges encountered and solutions developed
4. Next steps and anticipated results

1. Summary of field work implementation, progress, and remaining schedule based on Fred's qualitative reports plus weekly conference calls

Implementing data collection was initially delayed by a couple weeks due to a couple factors. MPOT is a new style of project for SWAP that combines its research and sales arms, and there was some confusion early on whether SWAP's sales force or research survey enumerators should conduct this study, and whether to do so together or separately. That is, the household visits include a sales pitch for the Cera Maji filter and, if the sales pitch is accepted, money is transferred in some form; the CHWs also know these neighborhoods well and are accustomed to negotiating payment terms. These tasks fall into the category of work for SWAP's team of Community Health Workers (CHWs) who earn a living selling SWAP health products, including the Cera Maji filter. However, the tasks of adhering to a sampling plan, requesting informed consent and recording some basic survey observations are generally conducted by SWAP's research team of survey enumerators. SWAP was uncertain whether to send out CHWs with enumerators in teams, or whether to train one group to perform the other group's duties. A further complication was that SWAP's CHWs earn their livings by commission, while the enumerators are paid a daily wage. SWAP did not want to start paying CHWs a daily wage and risk their not being willing to return to a commission-based pay schedule at the conclusion of the MPOT study. Finally, since the assignment to the treatment group that receives the novel MPOT sales offer and the control group that receives a traditional sales offer is done at the level of neighborhoods, and one CHW works within a neighborhood, SWAP had to figure out a way to properly incentivize the CHWs to follow protocol and stick to the assigned treatment for a given neighborhood or household (CHWs in novel neighborhoods stand to earn much higher commission than those in traditional sales neighborhoods, but also must wait for the commissions to be paid in installments).

In the end, SWAP decided that CHWs would initiate the sales offers and record the response (whether a sales offer was accepted or not), and that enumerators would follow up with the respondent a day or two later in order to collect some basic survey measures of factors such as wealth and household

demographics. Since the sales pitches can go much more quickly than the survey, SWAP decided this seemed most efficient in order not to take away too much time from the CHWs' normal activities. The CHWs were told not to offer any other products for sale during these visits (unlike a normal sales visit when they offer SWAP's basket of goods for sale), and SWAP developed distinct incentive systems for those CHWs assigned to traditional neighborhoods and novel MPOT neighborhoods. All CHWs were given a Cera Maji filter to take home as well in order to allow them greater familiarity with the product as they try to sell it. Finally, the enumerators, by following up with the households a day or two later, are confirming whether or not the CHWs are following a sampling plan that involves visiting every third household within a village. Reports from the field are positive on this matter so far.

These delays meant that both the survey enumerators and the CHWs had to receive some additional training, and field work did not begin until approximately mid-November. SWAP's offices have now closed as of December 19 and will not reopen until January 7 in observance of the Christmas holiday. Thus far, SWAP has collected and entered complete data (i.e., sales data from CHW visits and survey data from enumerators) on 160 households of the planned total size of 300. (More sales offers have been made but not yet entered into the database set up for transfer to the US; I am uncertain exactly how many of these have been followed up by a survey.) SWAP's data manager, Aloyce Odhiambo, has developed a data entry system that links the survey and CHW sales data, and is now in the process of developing a reliable method to also link the MPESA payments data to the baseline data collected by the CHWs and enumerators. Some unexpected complications have arisen on linking payment data to the correct respondent – in particular, some respondents are using a husband's phone and name to send money, which makes it difficult to link to the baseline data. We discuss this issue in greater detail in section 3 as well as planned responses to it.

The Christmas holiday is also unfortunate timing insofar as it is reasonable to expect many respondents are hesitant to make large health purchases around this time, and furthermore, for those respondents with children, many will have school fees due in January. We are tracking payments keeping these factors in mind but accept that this simply reflects the reality of any sales scheme implemented in the real (and developing) world.

When the SWAP offices reopen and data collection continues, SWAP plans to finish visiting the planned 300 households by the end of January. This puts us a little bit behind schedule but SWAP is confident they can work quickly to finish data collection and data entry. We hope to finish the project on time.

2. Analysis and discussion of preliminary quantitative results from the field thus far

The preliminary data we have in hand today contains 160 total observations, 74 of which are from households offered the novel MPOT sales offer (46%) and 86 of which were offered the traditional sales offer (54%).

Despite the setbacks on data collection, analysis of these preliminary results is promising. As shown in Table 1 below, 61 percent of households offered the MPOT sales offer (45 of 74) accepted the free trial with the understanding they should make installment payments at the end of the free trial. Of the 86 households offered a traditional sales offer for the full price of the filter, 15 accepted (17%). This figure

of 17% is also much higher than normal or anticipated, although we note that 10 of those 15 acceptances come from the same SWAP satellite office catchment area of Kakamega, which appears wealthier when looking at rates of asset ownership, and all 10 respondents offered the traditional sales offer from this office accepted (100%). (If we ignore these 10 observations from Kakamega, then 5 of 76 respondents accepted the traditional sales offer, or 7%, which is closer to our initial expectations.) We are still trying to confirm with SWAP whether or not this information from Kakamega is correct, but treat it as so for now. Even with this higher-than-expected acceptance rate of the traditional sales offer, this implies the MPOT sales offer increases rates of acceptance by 43 percentage points, or a nearly 250 percent increase.

Table 1: Acceptance Rates and Payment Rates of Distinct Sales Offers

	Offered sales offer	Accepted sales offer?	Started making payments?
Treatment (MPOT sales offer)	N=74	61%	47%
Control (traditional sales offer)	N=86	17%	n/a

Now, the true test for the viability of the MPOT sales offer is whether those respondents that accept the sales offer's free trial follow through by making (and completing) payments. Data on payment collections are still coming in and some households were still enjoying their free trials when SWAP went on Christmas vacation. We also have encountered some difficulties linking the payments data to the baseline data in practice (described below). We present a summary analysis of the MPESA payments data for now in Table 2. Three of the 45 customers who accepted the free trial (of the 74 offered it) have already paid off the Cera Maji filter in full; 21 of the 45 have made at least one payment (47%); payments range in size from as small as 50 Ksh to as large as paying off the filter in a single lump sum payment. The average payment amount is just under 650 Ksh, or just under half of the cost of the Cera Maji filter (retail price 1400 Ksh). The total revenue collected by SWAP under this MPOT plan is 13,600 Ksh, which amounts to just under 10 filters at the retail price, or a 22% overall payment rate (of the total money owed on 45 filters distributed for free trials).

Table 2: Preliminary MPOT Payment Data Summary Statistics

	Numbers	**Percentages**
Number of MPOT Clients	45	
Number of Clients Started Payments	21	47% of all MPOT clients
Average Payment Size	648 Ksh	46% of retail price
Total Revenue Collected	13,600 Ksh	22% payment rate

Although the data are not complete, we can also gain early insights into differences between those who accept either sales offer and those who reject it to determine if there are systematic differences

between the two groups. In Table 3 below we present differences in rates of ownership of certain durables as well as differences in some basic measures of knowledge about topics of hygiene and safe water across those who accept or reject their sales offer. By "accept" we mean either paid for the filter outright in the case of the traditional sales offer, or accepted the free trial with plans to pay off in installments via MPESA in the case of the MPOT sales offer. Again, these are only partial data and correlations, with small sample sizes. We hesitate to infer too much from their findings until we see the complete sample as well as the complete repayments data. (We do not discuss statistical significance in detail in Table 3 due to the small number of clusters possibly resulting in underestimated standard errors. We can address this problem with proper methods when the full data are available.)

In Table 3 we see that households with children under 5 years of age do not appear particularly more or less likely to accept either sales offer. Although these households arguably stand to gain the most from safe drinking water in the home, this result is consistent with the literature (Ashraf, Berry, & Shapiro, 2010; Holla & Kremer, 2009). We also do not see strong evidence that households who accept their sales offer are particularly more educated about health and hygiene. Approximately 58% of MPOT respondents and 65% of traditional sales offer respondents freely named boiling water as a method of diarrhea prevention, and differences across those who accepted or rejected their sales offer were small and not significant. The 15 households who accepted the traditional sales offer and paid 1400 Ksh upfront were significantly more likely to name filtering as a method of water prevention, and significantly less likely to name using WaterGuard than the 71 households who rejected this offer. These patterns also emerge among the MPOT respondents, although the differences are smaller and not significant. This could suggest that the filters are more likely to appeal to those already familiar with them, which makes sense.

We do see early signs that the wealthier households appear more likely to accept either sales offer: Respondents who accept either sales offer are significantly more likely to own a television and have a cement floor than are those who reject their sales offer. In the case of the 15 households that accepted and paid for the Cera Maji filter in full under the traditional sales offer, fully 10 of them (67%) had a cement floor, as compared to 17% of those who rejected the offer. Among MPOT homes, this difference was also notable although smaller in magnitude (47% of those who accepted MPOT had a cement floor versus 17% of those who rejected it).

Table 3: Preliminary Differences between Those Who Accept or Reject Their Sales Offer

	MPOT Sales Offer			**Traditional Sales Offer**		
	Accept	**Reject**	**Difference (p-value)**	**Accept**	**Reject**	**Difference (p-value)**
Presence of Child Under 5	0.64	0.59	0.06 (p=.563)	0.60	0.68	0.08 (p=.59)
Name boiling as method of diarrhea prevention	0.60	0.55	0.05 (p=.808)	0.60	0.66	0.06 (p=.59)
Name WaterGuard as method of water	0.49	0.66	0.17 (p=.34)	0.33	0.76	0.43** (p=.01)

treatment						
Name Filter as method of water treatment	0.33	0.21	0.13 (p=.32)	0.60	0.28	0.32* (p=.06)
Owns a television	0.40	0.15	0.25** (p=.02)	0.67	0.17	0.50*** (p=.00)
Owns a bicycle	0.56	0.41	0.15 (p=.24)	0.47	0.52	0.05 (p=.73)
Has a cement floor (not mud, dung)	0.47	0.17	0.29*** (p=.00)	0.67	0.17	0.50** (p=.03)
Observations	45	29		15	71	
Villages (clusters)	21			23		

***p<0.01, **p<0.05, *p<0.10.

The early evidence in Table 3 suggests that although wealthier households are still more likely to accept the MPOT sales offer than are the less wealthy, the MPOT offer performs better at bridging this wealth divide than does the traditional sales offer. That is, among the total of 60 households that accepted their sales offer, the 45 MPOT-accepting households are 20 percentage points (30%) less likely to have a cement floor and 27 percentage points (40%) less likely to own a television than are the 15 acceptors of the traditional sales offer. We will see if such patterns continue as more data are collected.

In Table 4 we consider the reasons provided why respondents rejected either sales offer. The far and away most common response among both groups was that the price of the filter was too high. 73% of those who rejected the traditional sales offer, and 86% of those who rejected the MPOT sales offer cited the price as the primary reason for rejection. Among the 13% (N=9) of those who rejected the traditional sales offer and offered a reason for the rejection that was not listed in our survey, six of them said that they would buy the filter if they were given more time to gather funds to pay (we did offer these respondents a week to gather funds if they prefer). If we interpret these six as also citing the price as the primary barrier, then 82% of the traditional sales offer rejections were due to price. In any event, price is clearly a primary barrier to filter purchase, and these early results do not make clear that the MPOT sales offer is fully overcoming this barrier. However, the 86% citing price as the reason for rejection of the MPOT sales offer are among only the 39% who rejected it, which is just 34% of the total among 74 respondents given this offer. This compares favorably to the 82% of the 83% who rejected the traditional sales offer, or 67% overall.

Table 4: Reasons to Reject Sales Offers by Type of Offer among Those Who Rejected

	MPOT sales offer rejections	**Traditional sales offer rejections**
Filter too expensive	0.86	0.73
Filter too small	0.03	0.01
Filter too delicate	0.07	0.00

Don't like study/sales offer	0.00	0.04
Other	0.10	0.13
Observations	29	71

3. Summary of challenges encountered and solutions developed

As with any field data collection effort, challenges have been encountered, both foreseen and unforeseen. We briefly discuss these here.

Qualitative and anecdotal reports from the field confirm the quantitative findings cited above. The novel MPOT sales offer is receiving high uptake and appears very popular. However, many CHWs are reporting that the respondents are accepting the free trial but are concerned about the fragility of the ceramic filtering pot itself, asking questions such as "What will happen if the filter breaks during the free trial – will I still be under obligation to pay for it?" CHWs advise them to take every precaution to prevent this from happening, and do not mention the spare filters secured for the study in the event of this happening , in order to prevent any negligence. Yet this question and concern suggests a potential limitation on uptake of the MPOT sales offer at scale if the filters prove too fragile.

The Siaya satellite SWAP office was home to previous organizations that distributed filters for free in previous projects. Some of the respondents from these neighborhoods were bothered that other NGOs were distributing the filters for free and SWAP was trying to sell it at full cost. None of the 25 respondents offered the traditional sales offer in this satellite office's catchment area accepted, but 14 of the 25 offered the MPOT sales offer accepted (56%).

Another challenge encountered by the CHWs was that many wives said they were impressed by the filter and by the MPOT sales opportunity, but that their husbands were in charge of making purchase decisions and thus they could not confirm agreement with the CHW during the visit. This result is not surprising and is common when considering demand for health products that are predominantly used by women yet must be purchased by men.

A further challenge for data collection and sales has been that the rainy season has lasted longer than usual, and this has slowed data collection as well as possibly dampened demand for filters since rain water collection is common when available. Also, CHWs complain about visiting households on market days and finding no one is home. SWAP agreed CHWs can conduct their regular sales operations at the market on these days and not conduct the MPOT sales offers with little productivity on these days.

Another challenge that primarily affected the enumerators has been that there was a nationwide strike among the Passenger Service Vehicle operators for a week. This slowed down survey data collection.

The biggest challenge encountered, however, has been that many wives send their husbands to the MPOT agent to send money due, and the husbands use their own phone and accounts. In many villages the market center where the MPESA services are is of some distance from the home, and many times husbands are sent to complete this errand on the wife's behalf. This makes it difficult in practice to link

the individual payments to the proper respondent. CHWs will now ask for all possible numbers and for the husbands' names in addition to the wives' names for remaining sampled households, and SWAP's data manager Aloyce Odhiambo is in the process of linking the collected MPESA payments data to the baseline data using names and other information. This process may involve having to call the respondents' numbers to confirm certain payments are correctly linked. This challenge is despite the fact that SWAP had installed the *Frontline:SMS Credit* software in order to handle the payment data requirements of this study since pilot work made clear that managing payments by hand was cumbersome and invited too many opportunities for error. A superior system will be needed if MPOT were to go to scale.

4. Next steps and anticipated results

When the SWAP offices reopen January 7 and the MPOT data collection efforts resume, we anticipate being able to wrap up data collection quickly and will concentrate our efforts on observing payment schedules over time for those respondents who accepted the novel MPOT sales offer as well as ensuring we correctly link the payments data to the baseline data collected by the CHWs and enumerators. Preliminary results are promising, and we look forward to the conclusion of the data collection phase to enable a full analysis and assessment of results.

Final Project Report: "MPOT: Mobile Payments Over Time"

Can Mobile Payments help Disseminate Health-related Goods? [1]

Jill E. Luoto and David I. Levine*

Children collecting water from a rural earthpan
(surface pond) source in Nyanza Province, Kenya

[1] The Safe Water and AIDS Project (SWAP – Kenya) carried out this study, and were capably led by Frederick Koga and Aloyce Odhiambo. This report is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of RAND and SWAP and do not necessarily reflect the views of USAID or the United States Government.
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1. Introduction and Project Motivation

Contaminated drinking water contributes to the deaths of 750,000 children under age five every year due to diarrheal diseases.[1] A number of randomized controlled trials have shown that low-cost point-of-use (POU) ceramic water filters are microbiologically effective and, when used, improve health.[2–8] In several studies, consumers preferred water filters to chlorine-based point-of-use treatment,[9–11] which may lead to higher and more consistent usage over time.[12] Gravity-driven filters that feature built-in safe storage also are easier to use than many other POU treatment options – with filters, you just add water. All told, filters may be the most promising point-of-use water treatment option for achieving scale and sustained usage.[13–15] Nevertheless, neither filters nor other point-of-use water treatment products are widely or consistently used anywhere in the developing world.

Like many durable health products, water filters face several barriers to their initial uptake. First, filters have a relatively high upfront cost, and many consumers face liquidity constraints. In addition, some consumers may have present bias, which reduces willingness to spend today for future benefits. Most consumers are also unfamiliar with whether filters work well and with filters' effectiveness in improving water quality.

A sales contract with a free trial, 'rent to own' installment payments and the right to return the filter and stop future payments can address all of these barriers. For example, such a sales contract resulted in a more than ten-fold increase in take-up for efficient cookstoves in Uganda: from 4% to 44% for a charcoal-burning stove in urban areas and from 5 to 55% for a wood-burning stove in rural areas.[16] It is plausible that similar sales offers can increase purchases for many other goods that share similar barriers to their uptake, such as modern fertilizers, long-lasting insecticide-treated bednets, and solar lights. We tested this model for selling filters in Kenya.

However, the Uganda marketing trial involved in-person collection visits for time payments, which are costly. This study tested whether making installment payments via mobile banking can overcome liquidity constraints and present bias with much lower transaction costs. We tested this hypothesis in Kenya, where access to mobile phones has skyrocketed in recent years and the mobile banking system M-PESA is widespread. 83% of Kenyans aged 15 or over were estimated to have access to a mobile phone in 2010;[17] as of 2011, 72% of Kenya's poor – those living on less than $1.25/day and outside Nairobi - had used MPESA's services.[18] This region also has widespread unsafe local water, and many households who aspire to own filters.

A small initial pilot study selling Cera Maji filters with the novel sales offer and M-PESA was encouraging. Ten of 16 households in peri-urban areas of Kisumu that were presented with the novel offer accepted the free trial. In total, 85% of payments were made on time, and 96% of revenue was collected in this small pilot. Of the 10 customers, just one returned the filter and stopped payments before completing the purchase. Importantly, no households stopped payments and refused to return the filter.

In this report we summarize findings from the larger study we carried out with USAID DIV funding to test this MPOT model among 300 randomly selected households in Kenya to offer filters for sale. The outline for the rest of this report is as follows.

2. Background
   2.1 Study setting
   2.2 The Safe Water and AIDS Project (SWAP)
   2.3 MPESA, Kenya's mobile money service
3. Evaluation Methodology
   3.1 Balance across study arms
   3.2 Summary statistics
4. Results
   4.1 Free trial versus purchase
   4.2 Delays in paying
   4.3 MPESA as a barrier
   4.4 Other results
   4.5 Potential social impacts
5. Conclusions
   5.1 Summary
   5.2 Discussion
   5.3 Implications
   5.4 Cost-effectiveness considerations
   5.5 Implementation lessons from MPOT and modifications going forward
   5.6 Project dissemination plans and future expansions

2. Background

2.1. Study setting

The project was located in Western and Nyanza provinces, two of the poorest provinces in Kenya. Most of the rural water is a combination of piped water to public taps and surface (river and ponds) water, almost all of which has bacterial contamination, or allows for recontamination between the point of collection and consumption.[9,19] Urban water is usually either piped (whether to a public tap or to private homes or plots) or, most often in informal settlements, also can be from shallow wells or water vendors. Thus, even in urban areas people are often still reliant on sources that can have bacterial contamination.[20] While most people are aware that water is sometimes unsafe, few treat their drinking water reliably and consistently.[9,19,21]

Although quite poor along most dimensions, as of 2010, an estimated 83% of Kenyans aged 15 and over had access to a mobile phone.[17] Moreover, in 2011 72% of those living on less than $1.25 a day and outside of Nairobi, Kenya's capital, were estimated to have used M-PESA.

Our study examined sales of the Cera Maji ceramic filter (Figure 1 below). Gravity-driven ceramic filters such as the Cera Maji are among the most common water filters in developing countries, in part because they can be manufactured locally almost anywhere. To use this filter, users pour untreated source water into a top inner bucket that has a ceramic filtering element at its bottom. Gravity causes the water to be filtered (and thereby cleaned) through tiny pores in this ceramic piece into a lower bucket from which (safe) water is drawn with a spigot.

Figure 1: Cera Maji Ceramic Filter

2.2 The Safe Water and AIDS Project (SWAP)

SWAP was the local implementing partner for this study. SWAP is a non-governmental organization operating since 2005 in western Kenya with its headquarters in Kisumu and 8 satellite offices located throughout western Kenya. SWAP serves as an umbrella organization with a network with over 3000 local "Community Health Promoters" (CHPs) who sell health-promoting goods in their communities as a form of income generation that also benefits the wider community. CHPs are local women and men (mostly women) drawn from vulnerable HIV support groups and community self-help groups throughout Western and Nyanza provinces. They receive some training in health and sales and distribute health-related goods such as bednets, liquid chlorine and nutritional supplements from SWAP's "basket of goods." They are also provided with a bicycle which is modified to carry products in a basket (hence "the basket of goods") which they use for their door-to-door sales. They map their area and each is given household and sales targets to meet. Each CHP sells to a specific neighborhood, typically as a part-time job.

SWAP contracts with the Kenya Ceramic Project based in nearby Western Kenya to manufacture and supply Cera Maji filters to SWAP vendors as one input to their basket.[22] The network of SWAP CHPs normally sell about 100 Cera Maji filters per month using a traditional lump-sum sales offer at a price of 1400 Kenyan Shillings (Ksh; about $16.80). This price represents full cost recovery,[2] yet take-up remains very low at about 1% of consumers in the areas where SWAP CHPs sell goods.

SWAP CHPs would like to sell more filters since the profit margins are greater on these higher-end products (150 Ksh of the 1400 Ksh full market price), than the more typical profit margins of 1-10 Ksh they receive on consumable products in their basket of health goods such as chlorine. Since their entire wage is based on commission, selling 1 filter to 1 customer can equal roughly 1.5 days' wages under the status quo. At the same time, filters are bulky. This means that in practice CHPs do not carry filters around in their baskets to sell them in their day-to-day operations, and under normal circumstances any customer who wishes to buy the Cera Maji filter has to 1) know this without seeing a filter directly, and 2) trust that the SWAP CHP will deliver the filter upon payment. Thus, the mark-up on filters may be too low to get CHPs to sell them at scale.

[2] SWAP pays 1100 Ksh to Kenya Ceramics for each filter, and includes a markup of 150 Ksh to offer CHPs the wholesale price of 1250 Ksh. The CHPs in turn have a 150 Ksh mark-up to form the market price of 1400 Ksh.

Figure 2: SWAP CHPs at a local SWAP Jamii (community) center

2.3 M-PESA

Kenya's mobile banking service M-PESA (M stands for mobile, and Pesa is Swahili for money) is an SMS-based money transfer system that operates throughout the country and has enabled many millions of Kenyans who otherwise lack formal banking services to be able to transfer money across long distances and pay for goods and services using their mobile phones.[17,23,24] M-PESA is run by Kenya's largest mobile network operator, Safaricom, which controls 80% of the mobile market.[17] Within its first three years of operation by 2010, nearly 60 percent of Kenyans used M-PESA's services.[17] As of 2011, an estimated 16 million users have M-PESA accounts in a country of 22 million adults aged 15-64 (~73%).[25]

An M-PESA customer can deposit, withdraw or send money by SMS to another customer by visiting one of 25,000 agents across all parts of the country.[26] Agents often operate out of local retail shops, street vendors, petrol stations, etc.

Users do not pay to create an M-PESA account. Normally, a small fee of 30 Ksh (roughly $0.25) is charged at the time of sending a payment via MPESA. For this study, SWAP paid the money transfer fee for payments sent under the *PayBill* service offered by MPESA which allows businesses to cover the transfer fees on payments received from customers. Due to its nonprofit status, SWAP received a discount price of 20 Ksh per transfer for this project.

Initially, SWAP assumed this plan would entail an average of 4 MPESA transfers per customer (at a cost of 20 Ksh each), each preceded by 1 SMS reminder at a cost of 1 Ksh apiece, for a total intended subsidy of 84 Ksh, or 6% of the retail price of the filter (1400 Ksh).

Figure 3: M-PESA money transfer point

3. Evaluation Methodology

We conducted a door-to-door sales experiment with 300 households in peri-urban Kisumu and rural areas within two hours' drive of Kisumu across five satellite offices of SWAP: Kisumu, Homa Bay, Siaya, Nyando and Kakamega. The first four sites are all situated in Nyanza Province with populations mostly of the Luo tribe. These areas are generally very close to Lake Victoria. Kakamega is in Western Province and is predominantly comprised of Luhya population. This area is further from the lake and is likely to contain more subsistence farmers and owners of small scale businesses. Kisumu, Kakamega and Homabay have urban, periurban and rural settings, while Siaya and Nyando have periurban and rural settings only.

In each of the 5 SWAP offices the office manager selected two neighborhoods that were sufficiently distant such that neighbors would be unlikely to hear of the other offer within the few weeks we were making sales offers. We assigned offers at the neighborhood level to avoid issues of jealousy across neighbors.

The office manager assigned a CHP and sales offer to each neighborhood. (We had intended each CHP to cover two smaller and disjoint neighborhoods, one randomly assigned each sales

offer, but failed to communicate this study design clearly to the implementation team.) Interviews with the office managers indicate that they chose CHPs that were active and lived near the chosen neighborhoods for this study. They also chose CHPs with above-average education, to facilitate explaining the features of the filter according to our script.

CHPs received their standard 150 Ksh mark-up on each filter sold. For sales made with time payments, we told CHPs the commission would be paid after the filter was paid off. In fact, commissions were delayed roughly six months until all collections were completed.

Within each neighborhood, the CHP selected homes at random, subject to the rule that each home not be visible from the prior home (to reduce social influence).

A day or two after the sales visits SWAP survey enumerators visited a household and asked to speak to the mother of the youngest child. We targeted mothers of young children because they stand to gain the most from safe water in terms of health benefits.[27] Kenyan households are often comprised of extended and polygamous families so there is often more than one mother in a single household; households with no children were still eligible for inclusion.

After making sure the household has access to a mobile phone and recording their mobile number(s), enumerators conducted a baseline survey of household demographics, basic assets, current water sources and water treatment, sanitation and hygiene behaviors, knowledge of the dangers posed by untreated local water supplies, and familiarity with the Cera Maji filter and competing POU product options (WaterGuard bleach solution, PuR flocculent-disinfectant[28], and Aquatabs[29] - See Appendix for more information on available competing water treatment products.)

CHPs then visited and gave a detailed presentation of the Cera Maji filter. (A copy of the sales presentation is in the Appendix.)

In the 5 neighborhoods assigned to the control group (n=150 households), CHPs made a traditional sales offer for the full price of the filter in one lump sum payment of 1400 Ksh (about $16.25 at current exchange rates). CHPs offered to return in one week to deliver the filter and collect payment if the respondent wanted time to speak to family members or gather funds.

In the 5 neighborhoods assigned to the treatment group (n=150 households), CHPs made the MPOT's novel sales offer of a free trial, time payments, and the right to return the filter and stop future payments. The CHP explained that households accepting the free trial would receive an SMS reminder message in two weeks requesting M-PESA payment, or the household could ask the CHP to return to pick up the filter. The CHP also explained that SWAP paid the money transfer fees for customers' MPESA installment payments. Acceptors of the MPOT sales offer signed a contract outlining the terms of this offer (in an effort to ensure their understanding and secure their commitment to its terms; see Appendix for a copy of this contract), and began their free trial at the end of the CHP's sales visit.

SWAP used *Frontline:SMS Credit* software to automate collection of payments and sending of SMS reminders. SMS messages were sent one and two weeks after the start of the free trial, and then every two weeks thereafter. Their content is listed in Table A1 in the Appendix.

For most households, the second payment came due during the 2012 Christmas holidays, and in January 2013 school fees were due. Thus, we choose to extend the period of payment beyond the initial schedule of six weeks. Unfortunately, that delay brought us to the end of February, which was too close to the national elections in early March to permit field operations. The previous national election in Kenya resulted in near outbreak of civil war, so we did not send staff into the field prior to or immediately after the election.

During the roughly six months of follow-up, households owing money received up to eight SMS and two or three follow-up phone calls.

Finally, in June 2012 SWAP research staff (usually accompanied by the original CHP) visited consumers to repossess filters that had not been paid for in full. These visits were pre-announced to customers via SMS or a phone call. Consumers had the choice to complete payments at that time. SWAP also refunded any payments of over 200 Ksh on filters it repossessed.

3.1 Balance across study arms

We had balance on a number of survey characteristics across treatment groups, allaying concerns about non-random assignment. Table 1 contains results of these comparisons with standard errors clustered at the level of neighborhoods (the unit of randomization). Across treatment and control neighborhoods we find similar rates of having permanent roofing, floor and wall materials, as well as similar rates of ownership of basic assets and water treatment behaviors. The only baseline variable with a statistically significant difference across treatment groups is the number of children less than five years of age, where the households in the treatment group have an average of 0.2 more young children ($p=0.05$). However, there is no statistically significant difference in the *rates* of households with children less than five (p-value of 0.28), suggesting this is likely due to chance given the large number of comparisons made. In total, we feel confident that we randomized effectively.

Table 1: Baseline Respondent Characteristics by Treatment Status

Baseline Respondent Characteristics		**Controls**	**Treatments**	**p-value**
Female respondent		0.94	0.95	0.88
Respondent age (in years)		41.1	36.2	0.12
Number of children		4.30	4.00	0.62
Number of children less than five		0.84	1.06	0.05**
Permanent roof indicator		0.91	0.95	0.51
Permanent wall indicator		0.32	0.33	0.97
Permanent floor indicator		0.31	0.34	0.84
TV		0.37	0.34	0.83
Radio		0.90	0.84	0.33
Refrigerator		0.07	0.05	0.79
Bike		0.47	0.54	0.53
Mobile phone ownership		0.86	0.95	0.05*
Asset index (counts up to 12 assets)^		4.93	4.99	0.95
Baseline Water and Hygiene Knowledge and Behaviors				
"Safe" Water Source indicator		0.43	0.54	0.66
Use WaterGuard (ever)		0.57	0.54	0.90
Boil water (ever)		0.19	0.17	0.83
Use a Filter (ever)		0.24	0.26	0.90
Use Lifestraw Filter (ever)		0.07	0.03	0.72
Soap in home		0.92	0.96	0.32
Defecate in open field		0.15	0.11	0.75
Sum of correctly named hand washing moments (maximum of 5*)		3.1	3.0	0.73
Treat water every day/always		0.29	0.25	0.87
Observations		150	150	

^Assets included in index: tv, radio, bike, mobile phone, refrigerator, motorbike, car, household help, indicator for owning land, permanent roof, permanent wall, permanent floor.

*Correct responses include: before food preparation, before eating, after eating, after visiting toilet, after farm work.

P-values based on F-statistics that take clustering by neighborhood into account. "Safe" water means primary source is piped or rain water.

There are larger differences across SWAP's satellite offices and across neighborhoods, although these differences are not statistically significant. We created an "asset index" that counts the numbers of assets owned from a list of 12 total assets asked about in our baseline survey (details in notes to Table 1). There were no differences in this index across treatments and controls overall (Table 1), and although we see bigger differences when we compare asset indices by Satellite Office, we cannot reject equality of this index across offices (5-way Wald test p-value=.33).

Table 2: Asset Indices by Satellite Office

Office	Asset Index
Homa Bay	4.63
	(0.26)
Kakamega	6.00
	(0.30)
Kisumu	5.63
	(0.28)
Nyando	4.98
	(0.21)
Siaya	3.55
	(0.23)
Total	4.96
	(0.13)

Standard errors in parentheses clustered at neighborhood.

3.2 Summary Statistics

As shown in Table 1 above, the mean respondent age was 38 and 94% of respondents were female. On average respondents had about 4 children, one of whom was 5 or under.

As we screened our respondents for having access to a mobile phone, we see in Table 1 we do not seem to capture the poorest of the poor. A significant majority have an iron roof (93%) and access to some form of sanitation (just 13% report defecating in open fields). Nonetheless, less than half of respondents (48%) have access to an improved water source (which we consider to include rain water collection or piped water), and 73% of respondents admit they do not consistently treat their water.

Although not shown in Table 1, Vestergaard Fransen had distributed free LifeStraw filters in 2011 to all households in Western province, in which the Kakamega satellite office of SWAP is located. These filters are smaller and generally found to be harder to use than the ones we were selling. Of the 60 Kakamega households we visited for our study at baseline, 15 (25%) reported regular usage of their LifeStraw filter, 10 in the traditional sales offer neighborhood and 5 in the MPOT sales offer neighborhood.

4. Results

None of the 300 households we visited had a Cera Maji filter at baseline.

As shown in panel A of Table 3, the traditional offer had 16% uptake (24 sales at 150 homes). This rate was higher than expected, and raises the possibility that adding salience and providing basic information about the filter can raise purchase rates.

On closer inspection, one of the 5 CHPs assigned to the traditional sales offer, in Kakamega, made the majority of the sales under this offer. That CHP made 14 sales from 30 visits (47% uptake), while the other 4 CHPs making the traditional offer made 10 sales from 120 visits (8%). We cannot be sure, but higher uptake in Kakamega may have been due in part to the quality of that CHP: he was an active CHP prior to this study and highly visible in promoting community health. In fact, he sold 11 filters during his regular (non-study) operations in the two months preceding our study.

However, Kakamega is also unique insofar as it was the only SWAP office located in Western province with a predominantly Luhya population. It was also the only office located within the catchment areas of Innovation for Poverty Action (IPA)'s chlorine dispensers as well as the freely distributed Lifestraw® filters from Vestergaard Fransen. However, no households at baseline reported usage of the chlorine dispensers. As mentioned above, 10 of these 15 customers who reported usage of their Lifestraw® filter were assigned to the traditional offer, and 5 were assigned to the MPOT offer. Of these 15 customers, just 1 (7%) accepted their assigned sales offer for the Cera Maji (under the traditional offer). This compares to 64% of those 45 customers who did not have or use their LifeStraw filters within the Kakamega catchment area accepting their sales offer (13 of 20 under the traditional offer, and 16 of 25 under the MPOT offer).

Kakamega also appears somewhat wealthier than the other satellite offices when we look at our asset index (Table 2), although we cannot reject equality across the 5 offices on this measure. Nonetheless, due to the likelihood of neighborhood characteristics influencing respondent's take-up decisions, we present separate results by satellite office in Table 3, and include satellite office fixed effects when we estimate the impacts of our MPOT sales intervention in equation 1:

1. $Y_{ifn} = \alpha + \beta MPOT_n + \delta_f + \varepsilon_{ifn}$

Here, Y_{ifn} is an indicator that equals 1 if respondent *i* from neighborhood *n* within the catchment area of satellite office *f* purchased a filter (and 0 otherwise). $MPOT_n$ indicates if neighborhood *n* received the MPOT (=1) or traditional sales offer (=0), and the δ_f are office fixed effects to capture time-invariant characteristics of the different satellite office catchment areas. We cluster the error term ε_{ifn} at the neighborhood level since this was the unit of randomization and to allow for correlated outcomes within neighborhoods that shared a common CHP.

As shown in Table 3 panel A column 2, the MPOT offer of a free trial followed by rent-to-own mobile payments had 29% uptake (44 sales at 150 homes), with 99% of revenue collected, which is statistically significantly higher than at control homes (P< 0.01, adjusting for clustering by neighborhood in estimation of equation 1). A total of 47 filters were distributed at end (31% overall uptake), with a total of 93% of revenue collected (including 3 filters neither returned nor fully paid for).

Table 3: Filter Take-up and Payment Performance

	(1)	(2)	(3)
Panel A: Overall Results	**Traditional Offer**	**M-POT sales offer**	
Have filter at study's end	0.16	0.31***	
Purchase filter	0.16	0.29***	
Homa Bay	0.13	0.30	
Kakamega	0.47	0.53	
Kisumu	0.10	0.13	
Nyando	0.10	0.27	
Siaya	0.00	0.23	
Observations	150	150	
Panel B: MPOT Households only	**Accept Free Trial**	**Return filter unpaid**	**Complete Payments via MPOT**
Overall	0.52	0.40	0.56
Homa Bay	0.50	0.33	0.60
Kakamega	0.53	0.00	1.00
Kisumu	0.33	0.60	0.40
Nyando	0.60	0.50	0.44
Siaya	0.63	0.58	0.37
Filter loss (neither return nor paid for)		0.04	
Observations	150	78	78

Notes: *** P<0.01; **P<0.05; *P<0.10. Calculation of statistical significance based on OLS estimation of equation 1 with errors clustered at neighborhood. Each office had N=60 observations, equally split into treatment and control groups (10 neighborhoods total).

4.1 Free trial vs. purchase

Panel B of Table 3 breaks down the results from our MPOT intervention into greater detail. The initial free trial was accepted by 52% of homes who received the novel offer (78 out of 150). Thus, 56% of those who accepted the filter paid for it fully by study's end (44 of 78).

Three households neither returned nor paid for their filters (3.8% of free trials). In one case the wife separated from her husband and took the filter when she moved to a different district. In a second case the customer died. In the third case, the customer was simply never again available. Thus, as in the two Uganda studies,[16] the rate of neither returning nor paying for the filter was quite low and there are no cases of keeping the filter and refusing to pay for it.

Unlike with the two studies of stoves in Uganda, the return rate for the filter was fairly high, 40% of free trials (31 of the 78, compared to 6% and 8% in the urban and rural Uganda studies). There is suggestive evidence supporting several possible reasons for the higher return rate in this study.

First, the sales offer was typically made to the wife, while the husband almost always owned the phone and received the SMS text messages asking for payments. Kenyan women are usually responsible for water treatment, but husbands usually have input (if not sole discretion) on the household's finances and purchases of major household items.[19] In some cases, the husband had not even been informed of the free trial or terms of the sales offer. In any case, some men were less interested than their wives in the filter.

In other cases the consumers liked the filter but could not afford it. For example, in one case a widow's brother-in-law was visiting and accepted the free trial. (In Luo culture, the brother-in-law is head of the household for his brother's widow.) When the brother-in-law returned to his own home (taking his mobile phone with him), the widow had no funds to purchase the filter. In other cases, consumers hoped to be able to afford the filter, but their incomes were lower or other expenses higher than they had hoped.

Our extended free trial may have promoted a return at one household. They used the filter for six months. A household member knocked the filter over and broke the ceramic piece a few weeks prior to repossession. Thus, when SWAP came to repossess the filter the household paid nothing. The household said they would purchase a new filter, but has not yet done so.

Finally, the filter was not that attractive to some consumers who accepted the free trial. That is, our observers saw evidence the household was able to afford the filter, but chose to return it. The main complaint recorded in these instances was disappointment that the filter did not keep the water cool.

The return rate was not only high, it almost always very delayed. Only 3% (1 of 31) of returns occurred as scheduled, at the end of the free trial.

In contrast, most returns (30 of 31) required SWAP staff to come to the household and repossess the filter after roughly six months of SMS reminders and phone calls. The typical consumer who kept the filter for many months claimed he or she would soon pay (or complete payments), but never did.

4.2 Delays in paying

Payments, like returns, were usually much slower than the original sales agreement. Of the consumers who purchased the filter with time payments, only 20% (9 out of 44) completed payments within the scheduled six weeks plus 2 weeks of grace period. The rest (80%) finished paying late. In practice, only 7 of the 44 paying MPOT customers made 4 complete payments, and surprisingly, 14 of the 44 paid off their filter in one lump payment despite the opportunity to stagger payments (although 9 of these were at the repossession visit). (17 customers made three or more payments.)

As noted above, part of the delay in paying was due to the timing of the initial sales offers, with the Christmas holidays, school fees, and the potentially violent election all delaying some payments.

4.3 MPESA as a barrier

At the same time, much of the delay appears to be due to MPESA being a less-than-ideal means for collecting installment payments in practice.

First, some SMS did not get through. Some recipients did not have a charged phone and some had changed phone numbers. In other cases, we gave free trials to households where only a neighbor had a phone, and fewer SMS arrived when the household required help from a neighbor. Our decision to present the sales offer to wives despite the fact that husbands often hold primary custody of the phone also likely contributed to low payments via MPESA.

Another unexpected problem we came across was that although we screened households on access to a mobile phone and willingness to use MPESA, in practice, some customers were unfamiliar with sending money (versus receiving it), and sending money via the PayBill system in which money is sent to a business (versus an individual) further confused some respondents. There were a few instances of customers sending money instead to the CHP directly. SWAP staff ended up having to train a number of respondent households into how to use the PayBill service, and produced a leaflet of instructions for this purpose. Although we were able to overcome this challenge in the field, familiarity with the business side of MPESA and mobile banking generally is an issue to consider as projects such as ours consider how to scale.

Roughly two-thirds of eventual buyers (29 of 44) only completed payments when SWAP staff showed up in-person to request payment or to repossess the filter after SMS messages went ignored. In total, 34% of the total collected revenues for the MPOT homes were done in-person, while 43% of MPOT customers paid entirely via MPESA (19 of the 44 customers who paid in full).

Collecting payments via mobile banking reduces transaction costs, but an in-person request likely exerts additional social pressure and salience to encourage compliance. Furthermore, for the customer there is a small transaction cost in terms of their time to visit an MPESA agent to send a payment. Due to our use of random sampling for the study, some customers were located quite far from an MPESA agent in practice. Sending money via MPESA also allows customers to procrastinate on paying more easily than does an in-person request. Finally, there is the question of whether the SMS were perceived as a credible threat. Since the SMS had requested payment but offered no consequences of non-payment, many customers likely simply enjoyed extending their free trials.

4.4 Other notable results

The random selection of consumers may have contributed to the late payments and many returns. We inadvertently tested this hypothesis when, prior to the study beginning, four of the CHPs made the MPOT offer to consumers they hand-selected. These consumers were often from groups they belonged to (e.g., a church or self-help group). The four CHPs made 66 offers and had uptake from 52 consumers (78%). They were paid fully via MPESA for 24 filters (47%), and the average customer paid 924 Ksh total of the 1400 Ksh price. Thus, when SWAP CHPs were able to hand-select their customers, they earned 64% of revenue on 52 sales overall, all via SMS and MPESA with minimal follow-up.

Although hand-selecting customers loses the benefits of randomization to inform the *public health* generalizability of the results, these results are the relevant ones from a *business* perspective: CHPs such as those who work for SWAP who depend on commissions for their livelihoods hand-select customers as a part of their operations every day. The results from this sub-study suggest that the MPOT offer may be more effective when CHPs are allowed discretion in choosing their customers. However, this might imply CHPs choose wealthier customers on average or customers with whom a CHP is familiar, or both.

To explore this issue further, in Table 4 we break down results of the characteristics of those who accept or reject their sales offers to test for any differences from our random sample of 300 households. Specifically, we test whether those who purchase their filters (under either sales plan) look different than those who refuse their offers; we also test whether purchasers under the MPOT plan look different than purchasers under the traditional sales plan (the controls). Because the decision to accept or reject an offer is nonrandom, these results are only intended to uncover interesting patterns ex post and do not imply any causal relationships.

Interestingly, we see that the MPOT sales offer seems to do a better job of reaching families with young children than does a traditional sales offer. Although this may be a spurious result as it is based on an analysis that was not planned prior to data collection, if this result generalizes it could be encouraging since young children benefit the most from safe drinking water. It is not obvious why MPOT would do a better job of reaching such families, but one possibility is that families with children who were faced with school fees during the study timeframe were better able to afford filters under the staggered payments. Contrary to our expectations, we do not see evidence that the MPOT offer was able to reach poorer segments of the population than was the traditional sales offer – accepters of both offers had higher wealth indices on average. However, we recognize that we lack sufficient power to test this hypothesis formally.

Table 4: Breakdown of characteristics of who accepts or rejects given sales offer

	Treatments						Controls			T vs. C
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Baseline Respondent Characteristics	Reject Free Trial	Accept Free Trial	p-value (Accept vs. Reject)	Do not purchase	Purchase filter	p-value (purchase vs. no)	Do not purchase	Purchase filter	p-value (Accept vs. Reject)	p-value (T vs. C for purchasing filter)
Female respondent	0.97	0.92	0.49	0.94	0.95	0.79	0.93	1	0.24	0.36
Respondent age (in years)	34.68	37.51	0.21	34.21	40.83	0.05**	41.11	40.75	0.76	0.98
Number of children	3.76	4.19	0.14	3.88	4.22	0.15	4.55	3.04	0.01**	0.06*
Number of children less than five	0.99	1.13	0.55	1.1	0.98	0.62	0.88	0.63	0.00***	0.10*
Permanent roof indicator	0.94	0.96	0.38	0.93	1.00	0.14	0.90	1.00	0.18	-
Permanent wall indicator	0.24	0.41	0.17	0.27	0.48	0.27	0.25	0.71	0.07*	0.37
Permanent floor indicator	0.23	0.45	0.08*	0.27	0.52	0.06*	0.26	0.59	0.28	0.83
TV	0.17	0.49	0.05**	0.24	0.57	0.12	0.31	0.71	0.02**	0.46
Radio	0.80	0.87	0.24	0.83	0.86	0.51	0.90	0.92	0.73	0.51
Refridgerator	0.01	0.09	0.20	0.03	0.11	0.12	0.06	0.13	0.23	0.92
Bike	0.46	0.62	0.03**	0.49	0.66	0.14	0.49	0.38	0.33	0.07*
Mobile phone ownership	0.97	0.94	0.83	0.96	0.93	0.74	0.86	0.96	0.08*	0.67
Asset index	4.19	5.71	0.06*	4.46	6.25	0.10*	4.63	6.50	0.03**	0.78
Observations	70	78	150	106	44	150	126	24	150	68

Notes: *** P<0.01; **P<0.05; *P<0.10. All p-values take into account clustering by satellite office. Columns 1 and 2 present mean summary statistics for who accepts versus rejects the offer of a free trial under MPOT. Columns 4 and 5 compare mean characteristics of those who purchase versus do not purchase under MPOT. Columns 7 and 8 make a similar comparison of purchasers with non-purchasers under traditional sales offer. Column 9 compares statistical significance of purchasers under MPOT with purchasers under traditional offer (i.e., testing column5 versus 8).

4.5 Potential social impacts

We believe that our project uncovered a latent demand for gravity-driven ceramic filters such as the Cera Maji, even if return rates for the filter were high under the MPOT plan. Reports from the field suggest that in the vast majority of cases the unpaid filters were in use by the households when SWAP staff visited to repossess them. (SWAP staff would instruct the household to pour the filtered water into another bucket or jerrycan, after first making sure the bucket was clean.) This suggests that the filter was popular, even if it was difficult to get some households to pay for it under this plan. Anecdotal reports from the field are that the Cera Maji filter is believed to make the water taste and look better than WaterGuard or other chemical water treatment products. The filter is also found to be simple to use for all household members, including children. Although our project was motivated by the desire to find cost-effective ways to distribute the filters by taking advantage of Kenya's vast mobile banking network, the fact that so many households did find means to pay for the filters when their repossession was imminent suggests that respondents truly came to value them.

At baseline, just 27% of respondents self-reported that they consistently treat their drinking water, and this number is likely to be inflated upwards due to courtesy bias. Although 41% of those who otherwise lack access to an improved source (which we define as piped water or rain water) reported consistent treatment, this implies that nearly 60% of respondents lacked access to

safe drinking water at baseline (and rain water is not always available year round). Thus, it is imperative to find new ways to deliver safe water to households in ways that they value and will use consistently.

The MPOT model for filters may have been particularly effective at getting non-consistent treaters into water treatment: 65% of those who reported inconsistent water treatment at baseline and accepted the MPOT offer paid off their filters by study's end (34 of 52 acceptors), versus 38% (10 of 26 acceptors) of those who said they always treated their water at baseline, a 27 percentage point difference (p-value = 0.10 taking into account clustering). Although this result is only suggestive, if it generalizes it would be encouraging news that our model was particularly effective at drawing into water treatment those households that for one reason or another do not like or value other water treatment methods, and upon learning that they indeed value the filter, they were willing to pay for it.

5. Conclusions

5.1 Summary

As in previous research, the free trial followed by rent-to-own substantially increased uptake of a relatively unfamiliar health-promoting durable good. No households were found to own a Cera Maji filter at baseline and by the end of our study, 29% of those offered a filter under the MPOT plan had accepted and paid in full. This project was motivated by the hope that collecting installment payments by mobile phone banking would lower transaction costs. Those cost savings did not fully materialize in this setting due to the high rate of late payments and returns, and many payments necessitated an in-person visit to gain compliance.

5.2 Discussion

Some of the late payments were due to SMS messages not getting through (often because the wife did not own her own phone) and due to lack of familiarity with MPESA's PayBill service, perhaps especially for sending money to a business account (as opposed to sending money to an individual or receiving money).

At the same time, the late payments were *ex post* a rational strategy for many consumers. First, many households in our study area had received a free water filter or other free water treatment products from different NGOs at various points. As SWAP made minimal efforts to repossess the filter, consumers may sensibly have considered it plausible that they could keep the filter indefinitely without paying. In addition, each period of non-payment extended an interest-free loan from SWAP.

The decision not to pay also gave consumers who were willing to purchase the filter a valuable option; they could return the filter if it broke and owe nothing.

Finally, consumers who did not intend to pay (or who knew they were unlikely to have the funds) but claimed they would soon pay enjoyed a free trial that ended up extending for over 6

months – permitting them to enjoy several dollars' worth of clean water services before SWAP repossessed the filter.

High return rates were a problem in addition to late payments. In contrast, in the two studies of stoves in Uganda almost all consumers who took the free trial purchased the stove. It is likely the return rates in those studies were lower because the cookstoves, unlike the filter, saved money or time spent gathering fuel immediately.

5.3 Implications

It is likely the return rate would have been lower if the vendors had marketed to both the husband and the wife or if the filter were a more attractive product or one that saved money for consumers in ways they could recognize immediately. Both the uptake and return rates might have been lower if the vendors had done a better job of informing consumers of the filter's characteristics and cost (so more households that were a poor fit would have turned down the free trial).

It is also likely the rate of late payments would have been a bit lower if vendors had trained consumers on using M-PESA to make payments right from the start. At the same time, given that SWAP had multiple communications prior to repossessions, including in-person visits to many homes, it is unlikely that lack of familiarity with MPESA was responsible for the substantial share of sales that did not pay up until there was a threat of immediate repossession.

Rent-to-own payment plans may work better when consumers are more used to them or when the vendor has a reputation of repossessing items that fall behind in payments. Such payments also might work better if consumers paid fees for late payments or received a discount when payments were consistently timely.

While not permitted under current mobile banking regulations in Kenya, setting up direct withdrawal (perhaps from a linked savings account) might also permit rent-to-own payments over mobile banking to work more effectively.

5.4 Cost-effectiveness considerations

Due to the bulkiness of the filter and the high rate of returns, it was necessary to use a SWAP vehicle to repossess unpaid filters in this study. The cost of doing so is prohibitively expensive and makes this model not very cost-effective as we think about potential scalability of MPOT.

As stated earlier, the original plan assumed that SWAP would provide a subsidy of roughly 84 Ksh per purchased filter under the MPOT plan, or 6% of the retail price. In practice, the SMS sometimes went ignored and a SWAP representative would make a (more expensive) phone call or in-person visit to the customer to request payment. The average customer who accepted the MPOT sales offer received 8 total SMS, 2.4 phone calls, and 1.2 in-person visits. Following these efforts, 56% of MPOT's acceptors paid off in full, making an average of 2.1 payments; 40% returned their filters, and 3.8% of filters were lost or stolen (3 of 78). If we assume that a phone call from headquarters costs 10 Ksh (roughly $0.15) and a visit by a SWAP CHP costs 86 Ksh ($1.00), together with the prices for MPESA transfers and SMS, this results in an average

subsidy of 177 Ksh per distributed filter, or roughly 13%, which is higher than what was originally envisioned but still might be reasonable as a model for distributing water.

However, despite these follow-up efforts, just 56% of filters were paid off in full at study's end. This means that SWAP earned a total of 61,600 Ksh in revenue from 44 filter sales. This does not make up for the losses incurred: 177 Ksh per filter for the 34 filters that were not paid off, at a total of 6018 Ksh. If we assume repossessed filters can be resold on a secondary market but lose 35% of their value, this totals losses of 15190 Ksh on the 31 returned filters (3 were lost altogether). Total losses sum to 21,208 Ksh, which must be added to SWAP's total costs of 1100 * 78 distributed filters (85,800 Ksh), or 107,008 Ksh, which is already higher than total revenues, even if we add to revenues the potential sales from SWAP selling all 31 repossessed filters at 65% of their original market value.

Despite these discouraging numbers, under reasonable assumptions and appropriate modifications, we believe this model might become cost-effective, at least from a societal standpoint. We believe the high rate of filter returns are ultimately what made this model not cost-effective in this setting. If we can drive up payment rates (or alternatively drive down the rates of those who accept the free trial but then fail to make payments), we could become more cost-effective. In particular, we have a number of parameters we could potentially tweak in future studies to improve upon these numbers. One, if the threat of repossession were credible, payment rates might increase without an in-person visit. Two, if customers were more familiar with MPESA and PayBill in particular, payments might increase. Three, lowering the overall price of the filter with the help of carbon credits could increase payments. Four, presenting the sales offer jointly to husbands and wives could increase payment performance by ensuring the purchase decision is a shared one. Five, as suggested by our inadvertent pilot when CHPs were allowed to choose their customers, being more selective about customers might increase payments – this could imply customers who own their own phones (versus have access to a neighbor's), are wealthier on average, live closer to an MPESA agent, or are simply known by the CHP (in order to overcome problems of asymmetric information between customer and salesperson).

With one or more of these adjustments, we are cautiously optimistic that the MPOT plan could become more cost-effective, at least from a societal standpoint when one considers that just 27% of households at baseline report consistently treating their drinking water. Even among the 60 Kakamega households in our sample that should have received a free LifeStraw filter from Vestergaard Fransen®, just 25% reported having the LifeStraw filter at baseline (suggesting many had disregarded it in one way or another), and none of these reported consistently treating their water with the LifeStraw (although their rates of acceptance of the Cera Maji were much lower than other Kakamega households under either sales plan).

5.5 Implementation lessons from MPOT and modifications going forward

We learned some valuable lessons from this project as we think about next steps and the potential scalability of our model. Interviews with SWAP CHPs have convinced us that the free trials with the bulky filters proved cumbersome in practice, particularly in sparsely populated areas. In addition, the CHPs did not enjoy having to wait many months in order to receive their

commission under the MPOT plan. We believe that outside of research settings the CHPs should be allowed to customize the sales model to fit their clients and their needs. This could encourage greater buy-in on their part, as well as potentially greater sales of filters among their customers. We briefly outline some of our ideas here for how to achieve these goals.

Feedback from the CHPs suggests that despite its inconvenience, the free trial was valuable for increasing product awareness and consumer interest. In fact, the CHP in Kakamega who sold 11 filters prior to our study, as well as 14 of the 24 total filters sold under the traditional sales offer in this study, is said to have demonstrated how to use the filter in village groups as a part of his regular sales operations. Although this is only anecdotal evidence, we were told how group members would see the filter in action and agree among themselves to purchase filters. Normally, since most CHPs do not travel to their customers with the filters in-hand due to their bulky size, it forces them to rely on printed marketing materials to pique customer interest. Thus, although the free trial was cumbersome in practice, it potentially adds salience to the attractiveness of the filter.

In light of these findings, we suggest the following modifications to the free trial component of our MPOT sales offer. In villages with houses located close together, CHPs could have one filter clearly labeled "Property of SWAP" that they can lend out for brief free trials. In villages with dispersed neighbors, CHPs could own a filter for their own household and agree to demonstrate the filter at the village chiefs' barazas (meetings) and to let their neighbors visit to familiarize themselves with the filter.

In future trials of the MPOT offer we also intend to present the sales offer jointly to husbands and wives to circumvent problems of intra-household differences in preferences. We also believe that restricting the MPOT offer to households that own their own phone (versus have access to a neighbor's) would improve outcomes.

Another potential modification worth considering in light of the high return rates for the filters is to change from a pure 'rent-to-own' plan (where customers have the filter while paying it off) to a layaway plan (where customers pay first in installments and receive the filter after). This plan could still utilize MPESA as a medium for holding such installments, reduces risks for CHPs (thereby increasing potential scalability and vendor buy-in), and potentially saves on transaction costs associated with filter repossessions in the event of nonpayment. It proved difficult in practice to convince the CHPs and SWAP staff to repossess the filters and not extend the free trials further for non-paying customers (who inevitably had a good excuse for their nonpayment). A layaway plan would circumvent this problem. However, the primary disadvantage of this plan is that it forces the customers to be patient as they save up for the filter. It also relies on customers trusting the SWAP CHP and/or MPESA as a savings medium. Nonetheless, we believe it is a strategy worth testing due to the fact that even with all of the unexpected challenges encountered, our study increased rates of Cera Maji filter ownership from zero to 29% from baseline to six months later under our MPOT sales intervention, suggesting there is a latent demand for these filters – we just need to find the best means to make them available and affordable to all.

The free trial followed by rent-to-own remains a promising route to increase demand for durable goods that improve people's living standards and health. At the same time, mobile banking was

not an effective means to collect time payments in this study. More research will be needed on finding means to reduce transaction costs if this simple sales offer can help disseminate more health-related goods in poor settings.

For other social enterprises interested in distributing health products with a sustainable business model, we believe our results highlight that installment payments can help overcome liquidity constraints for the poor on higher-margin durable health products. However, collecting such payments via mobile banking after the consumer possesses the product has risks that must be mitigated to be successful.

We believe this model has the potential to scale with any organization capable of collecting installment payments in person with low transaction costs. SWAP, for example, has community health promoters who regularly visit neighbors to sell health-related goods (CHPs have as a goal to visit each of their assigned households roughly once per month). In addition, partnering with a microfinance institution that is accustomed to collecting installment payments (after giving out a loan) is another promising strategy. We will request DIV stage 2 funding for scaling this approach within SWAP's business model, and are also working with BRAC Uganda and ImpactCarbon in Uganda to scale these approaches to selling filters, solar lights, and cookstoves. Fine-tuning the model to understand what the best design is would be another key step to take to enable SWAP or a similar outfit to carry this forward independently as a part of its operations. For example, is the free trial a necessary component and could layaway payments (where customers receive the filter only at the end of paying) work as well as rent-to-own payments (where the customer has the filter as she pays it off) to increase uptake? Layaway payments reduce risk for SWAP's salespeople, which is one key ingredient to their own buy-in to the model, but this might be less attractive to the end customers themselves. Answers to these questions can help improve the potential scalability of this model.

Each stakeholder interested in adopting this model would need to train vendors in the new sales techniques, as well as set up mobile banking systems to track payments. These stakeholders also bear the risk of providing some free trial products. Interested stakeholders can learn important lessons from our research findings here including the importance of in-person collection of installment payments and the importance of having a desirable product to sell. Our research contributes to improving the design of a sales contract meant to overcome the barriers to purchase for important durable health products.

5.6 Project dissemination plans and future expansions

We plan to disseminate lessons learned from the project in multiple ways over the coming months. We have submitted a draft of our results to present at the Northeast Universities Development Conference (NEUDC), and plan to turn this report into a RAND working paper available online. We will additionally update the project website to include a synopsis of the results and lessons learned (http://www.rand.org/labor/centers/rapid/projects/kenya-water-filters.html). We will also submit a revised version of this report to a peer-reviewed journal.

RAND's working relationship with SWAP continues. We have secured seed funding from the Saving Lives at Birth® funding partners to implement a trial that combines the MPOT sales offer for Cera Maji filters with an integrated model of SWAP CHPs working out of antenatal care (ANC) clinics. The ANC clinics are arranging for group-based ANC, whereby expectant mothers attend ANC in groups based on their estimated due dates. During these group-based appointments, SWAP CHPs are teaching important lessons on health and hygiene topics such as the importance of handwashing and breastfeeding. They are also able to offer health products for sale from their basket of goods, including the Cera Maji filters with a modified version of the MPOT sales offer. This design can streamline the delivery of multiple health products and services and targets them to a population of interest: pregnant mothers and those with young children. This project is only just now beginning but we are quite excited for what we will learn. We additionally will apply for Stage 2 DIV funding to build on these lessons learned from MPOT and scale through the network of SWAP CHPs.

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Appendices

Table A1: Content of SMS messages sent to MPOT households who accepted

Weeks after starting free trial	Approximate content of the message
1st week after free trial	Hallo, I hope the filter works best for you. Remember your free trial time is over and you should now start paying. Thanks Aloyce Swap
2nd week after free trial	Hallo, continue using the filter to make your water safe for drinking as you continue paying for it as well. Thanks Aloyce Swap
Roughly every 2 weeks thereafter	For those who had completed paying: "Thanks for the completion of your payment." Those who had not completed payment were sent the same message as above at 2nd week.
Last weeks prior to recollection for non-payers	Hallo, Remember safe water is good for your health and the health of your family. Complete your payment as we agreed before we collect back the filter. Thanks.

Filter Promotion Script at CHP visits – READ TO ALL HOUSEHOLDS (MPOT's Novel and Traditional sales offers)

Preventing Diarrhea

How do you prevent diarrhea? [pause. Agree with all correct answers]

1.):_____ DO NOT READ THE CHOICES. PROMPT THREE (3) TIMES. INDICATE 1=NAMED; 2=NOT NAMED, FOR EACH OPTION BELOW.

[-----] (a)THERE IS NO WAY TO PREVENT DIARRHOEA
[-----] (b) BOIL DRINKING WATER
[-----] (c) DRINK ONLY CLEAN WATER
[-----] (d) USE LATRINE
[-----] (e) PROPER COOKING OF FOOD
[-----] (f) DON'T EAT SPOILED FOOD
[-----] (g) EAT CLEAN/PROTECTED/WASHED FOOD
[-----] (h) WASH HANDS
[-----] (i) SOLAR WATER DISINFECTION
[-----] (j) GOOD HYGIENE PRACTICES
[-----] (k) DON'T EAT TOO MUCH
[-----] (l) MEDICATION
[-----] (m) CLEAN DISHES/CLEAN UTENSILS
[-----] (n) BREASTFEEDING

[-----] (o) USE COMPOST PIT/KEEP COMPOUND CLEAN
[-----] (p)LEAVE WATER IN THE SUN

To know how to prevent diarrhea, we have to know how you get diarrhea.

How do you get Diarrhea? [pause. Agree with all correct answers]

2. (Record first reason given for getting diarrhea):_____ RECORD FIRST RESPONSE GIVEN IN SPACE ABOVE.

[-----] (a) DRINK DIRTY WATER
[-----] (b) DON'T WASH HANDS
[-----] (c) DON'T WASH FOOD/EAT DIRTY FOOD
[-----] (d) DON'T KEEP COMPOUND CLEAN
[-----] (e) DON'T WASH DISHES
[-----] (f) WASH WITH DIRTY WATER
[-----] (g) WASH WITH DIRTY WATER
[-----] (h) OTHER (SPECIFY):_____

INTERVIEWER SAYS: I would like to spend a few minutes to talk to you about water and sickness and to describe to you a product that can make your household's drinking water safe to drink. I will answer any questions that you have about the product that I will now describe. This should not take a long time.

I would like to first talk with you about some of the sicknesses that water can cause, and then later to give you some information about a solution that can help to prevent some of these sicknesses.

One particular illness, diarrhea, is particularly linked to bad water. Did you know that?

- One of the leading causes of diarrhea is drinking, washing with, or bathing in contaminated water.

Have you had diarrhea before?

Do you know anyone who has died from diarrhea, or anyone whose child has died from diarrhea?

It may seem uncommon, but around 35,000 children under 5 years of age died from diarrhea last year in Kenya. More than a million children died worldwide from diarrhea last year.

Repeated diarrhoea can also make it harder for young children to grow up strong and healthy.

This is very sad because we know how to prevent and treat diarrhea.

How do you treat it?

(IF THEY MENTION ORS): Oral Rehydration Solution (ORS), that's right.
(IF THEY DO NOT MENTION ORS): explain ORS and how to use it.

3.):_____CHECK 1=YES, 2=NO

But it can be easier and less painful to ***prevent*** diarrhea than to treat it. One way to prevent diarrhea is to make sure your family drinks clean water.

Clean water is not always easy to recognize. Here are a few things you may not know on what makes water clean:

- Even if water looks and tastes clean, it may still be dirty because of little disease germs we can't see with our eyes.
- Even if the water is clean when it is collected or purchased, it may be contaminated by the time people drink it. This can happen if little disease germs that we cannot see with our eyes get in the water, while it is stored in the home. This happens when adults or children touch drinking water, often in the process of retrieving water.
- We should avoid touching water that will be used for drinking.

Ways to Purify Water

To have safe, clean water what can we do?

[Listen to answers.]

4.):_____RECORD ANSWERS GIVEN.

[-----] (a)USE WATERGUARD
[-----] (b) BOIL DRINKING WATER
[-----] (c) FILTER WATER
[-----] (d) USE PUR
[-----] (e) USE ALUMINUM SULPHATE
[-----] (f) USE KLORINE
[-----] (g) USE AQUATABS
[-----] (h) USE AQUAGUARD
[-----] (i) USE CHLORINE DISPENSER
[-----] (j) FILTER THROUGH A CLOTH
[-----] (k) LET WATER SET
[-----] (l) OTHER (SPECIFY):_____

Let me got though the answers you gave

[Review only the answers below that they give.]

Filter through a cloth (not safe)

- You can filter water with a cloth to make water clear, it does not make it clean and safe. Most of the dangerous germs from the crap are very small and go through the cloth easily.
- Even worse, the cloth gets dirty, so it often *adds* germs to the water!
- This method is *not safe*.

Let water set (not safe)

Letting water set lets dust settle to the bottom. But *lots* of germs from the crap remains floating in the water. This method is *not safe*.

Boiling Water (safe)

Boiling is a great way to kill the dangerous germs in your water – as long as you boil *all* the water you drink and never touch the water.

But many people do not always boil because:

- Takes too much time boiling and cooling the water
    - Sometimes people just heat the water, without making it boil for a few minutes. That just warms the germs, without killing them.
- Even after boiling, we have to filter with a cloth or let the water settle to get rid of dust.
- Many times the cooking burner is busy. Sometimes there is no gas to boil.
- Boiled water doesn't have good taste
- Hot water can burn children

How many of you use a scoop to get water out of the jar? Unfortunately, even after you boil water, when dirty hands touch the water, it becomes contaminated again.

Chlorine (safe)

Chlorine is another good way to kill all the dangerous germs in your water.

But many people do not like chlorine because it changes the water's taste and smell.

Filter (Safe – read this section to all households whether or not they mentioned filtering as a method of making water safe)

This is the product I am here to talk to you about today

(If have a filter present, set it up as you speak. Show how it will be used. If no filter present, show pamphlets and marketing materials of Cera Maji filter as you speak.)

The filter is the most popular way to make the water clean because:

- It is easy to use
- It makes water clear and removes contamination
- It does not takes much of your time because you just pour water in the top and let it be
- It doesn't change the taste of our water
- It includes safe storage with this pot
- You can draw the water through the tap, which prevents hands from touching the water
- It looks very nice

Using one of these filters alone will remove nearly all dangers from the water.

- There are a few tiny germs that sometimes make it through. So to have absolutely safest system, you could put boiled water in the top of the filter.
- But whether you boil or not, using the filter will make your water *much* safer.

Financial Burden of Filter

Many people do not buy filters only because they believe the filter is too expensive.

Most people forget that diseases are also expensive. They cause us to…

- Take time off work, lose income

- Pay for hospital bills

How much do you think it costs to have a kid in the hospital for diarrhea? Make sure you include the cost of transport to the hospital, the work you will miss, the cost of the drugs you will have to buy, and all the other expenses!

If the filter were used regularly, then these problems would be less common, and families could save money!

Review

So let's review.

- You know children who have been ill with diarrhea?
- You understand how water becomes contaminated?
- You think it is a bad idea to drink contaminated water?

- Then clearly this water filter is a great opportunity for you. It addresses the problems you have mentioned. And it is full of new and improved features!
- Millions of people use water filters to get pure and safe water.
- I am sure someone of your experience can see the many benefits of the water filter!

[READ THE FOLLOWING ONLY TO NOVEL SALES OFFER HOUSEHOLDS]:
At the same time, I am sure someone of your experience knows that sometimes salespeople over-promise.

- You do not trust everything someone says, do you?
- You like to see things with your own eyes, right?

Well, that is great! Because today I have a special offer for you! This offer is only in select neighborhoods in [this town] and it is only offered today. This special offer is for a ***free trial*** of this filter for **two weeks**! Free trial means you pay *nothing!*

I will text you in a week asking how you like the filter. If you do not like it, just reply asking me to come pick it up.

If you *do* like the filter, you might be worried, "How can I afford such a nice product?" Well, do not worry! This filter costs 1400 Ksh, but you are allowed to pay in installments via M-PESA over the course of two months! That is, after the two week free trial, if you decide to keep the filter, we can set up a personalized payment plan for you to pay for the filter in two months' time. I will text you in advance of each scheduled payment to remind you of your payment due, and you can use M-PESA to send the money. You do not have to pay the M-PESA transfer fees either – those are included in this price!

If you ever do not like the filter, just text back and we will come pick it up. You will owe no more money after you return the filter.

Would you like to accept the free trial of this filter? Remember, it costs you *nothing* to enjoy a free trial!

5A. Record if free trial accepted: _____ (yes/no)
5B. Record mobile phone number associated with M-Pesa account:_____

6. Filter client name:_____
7. Compound name:_____
8. Nick name/landmark:_____
9. Village name:_____
10. Traditional sales offer:_____
11. Novel sales offer:_____
12. Reason why not accepted (if not accepted):_____
    a. Filter is expensive
    b. Filter is small
    c. Filter is delicate
    d. Don't like study
    e. Not home during visit
    f. Other (SPECIFY):_____

Background Market Research

Water Treatment Products

In this area of Kenya there are multiple point-of-use (POU) safe water treatment products commonly for sale. In Table A.1 below we briefly summarize the available products and their key characteristics. Some products, such as WaterGuard (a chlorine-based product), are better known than others, likely due to the fact that it has been on the market the longest, and due to the heavy levels of social marketing and brand awareness by PSI and other NGOs that work in this area.

Table A. 1: Safe Water Product Options

Product Class	Brand name	Mechanism of treatment	Manufacturer	Unit	Effect (Per unit)	Retail price (Per unit)
Consumable	PUR	Chemical flocculation and disinfection	P&G	4g per sachet Powder	10 L per sachet	KSh 5 / US$ 0.06
Consumable	Aquatabs	Chemical disinfection	Medentech (Irish company)	5 strips of 10 tabs; Tablet	20 L per tablet	KSh 20 / US$ 0.24
Consumable	WaterGuard	Chemical disinfection	WaterGuard	150 ml Liquid bottle	20 L per dose[3]	KSh 20 / US$ 0.24
Durable	CeraMaji water filter	Ceramic filter	Kenya Ceramics	1 filter	8.5 L per pot	KSh 1,300 / US$ 15.60
Durable	Chujio water filter	Ceramic filter	Chujio Ceramics	1 filter	8.5 L per pot	KSh 1,700 / US$20.40

WaterGuard is also among the most cost-efficient water treatment products or methods, with an estimated 3-year cost of 720 Kenyan Shillings (Ksh; about $8.50) and 6-year cost of 1440 KSh for a typical family size and level of water consumption (assuming a simple rule-of-thumb that one bottle lasts a typical household for one month). The CeraMaji ceramic filter (the featured product for M-POT), has a 3-year cost of 1300 Ksh, and a 6-year cost of 1900 Ksh (to replace the ceramic bowl, estimated to last for 3 years), making it more expensive than chlorine, but less

[3] Waterguard dose is 1 bottle cap for water without residuals and 2 bottle caps for water with residuals

expensive than PUR, which has an estimated 3-year cost of 5,400 KSh and 6-year cost of 10,800 Ksh (assuming 1 sachet per day).

We briefly summarize customer opinions of the products that compete with the filter based on qualitative project field work in the following table.

Table A.2: Customer Competing Product Reviews

Treatment Method	Picture	Customers Opinion
WaterGuard		• Most Popular • Easy to use: It is not necessary to stir • Efficient • Cheaper than PUR and Water Filters • Powerful brand recognition[4] • Smell and taste is a complaint of some customers • Some customers pointed that they get confused about when they should use 1 or 2 bottle caps as the dose
PUR		• More expensive • Process is longer and demands more effort than WaterGuard • Good when water is turbid
Aquatabs	Aquatabs water purification tablets	• Not as popular, but one of the customers interviewed was using it and considered it simpler than other options
Boiling		• More common among very poor population • Free (if abundant fuel (wood) available) • Customers admit they do not always boil because time is an issue

[4] Although WaterGuard competes with Aquatabs which has exactly the same formula and is cheaper, customers prefer to buy WaterGuard because of its strong brand recognition.

FOR THOSE RESPONDENTS WHO ACCEPT NOVEL SALES OFFER (THIS CONTRACT APPEARED ON SWAP OFFICIAL LETTER HEAD)

MPOT Payment Contract Form

Today's date (dd/mm/yyyy): _____

I, _____(customer name), willingly accept the offer of a free product trial for the CeraMaji filter from the Safe Water and AIDS Project (SWAP) and its representative, _____(insert CHP name here). As a part of this agreement, I hereby acknowledge the following terms of this contract (both customer and SWAP CHP should initial each point of this contract below).

1. I agree that the date of my free trial to begin is : _____(insert start date of free trial in dd/mm/yyyy format for date that filter will be delivered). Customer initials here:_____.
2. I agree that my free trial will end on: _____(insert end date of free trial that is two weeks after start date in #1 above, write in dd/mm/yyyy format). Customer initials here:_____.
3. I agree that at the end of my free trial, if I elect to keep the CeraMaji filter, I will make a first payment in the amount of _____Ksh (fill in amount of first payment) on the date my free trial ends specified in #2 above. Customer initials here:_____.
4. After this initial payment, I agree to pay a total of 1400 Ksh to SWAP within a period of two months from the date that my free trial with the filter ends, which is the effective end of this contract. This means I will pay a total of 1400 Ksh by _____(insert end date of contract in dd/mm/yyyy format, which is two months from date in #2 above).
5. To meet my contractual obligation, I promise to make regular payments according to the following plan I have selected. I will make payments in the amount of _____Ksh every _____(insert or circle frequency of payments: daily/weekly/biweekly/monthly), for a total of _____ payments.

<u>(CHP: ENSURE THE PAYMENT PLAN ESTABLISHED TOTALS 1400 KSH).</u>

I hereby sign my agreement of this contract.

_____ _____

(signature/marking of customer) (signature of CHP)