

## Household Water Treatment and Safe Storage (HWTS) Implementation Case Study: Biosand Filters and Membrane Filters in Kenya



### Program Details



**Lead Organization:** Aqua Clara Kenya

**Product / Technology:** Biosand filters (plastic) and membrane filters

**Dates:** 2007–2017 (ongoing)

**Filters Distributed:** Over 5,000 biosand filters and over 2,000 membrane filters as of July 2016







### Program Overview:

Aqua Clara International (ACI) is a nongovernmental organization (NGO) headquartered in the USA and operating in Kenya as Aqua Clara Kenya (ACK). It uses a partnership-based, entrepreneurial model to sell sustainable technologies for water, sanitation, and hygiene. ACK aims to reach Kenyans living on less than US\$2/day.

In 2007, ACK developed a modified biosand filter (BSF) housed in a plastic container. They have distributed this filter for nearly 10 years. More recently, ACK recognized the need for an alternative technology that is more appropriate for urban and peri-urban regions. The BSF is not ideal in these areas because water supplies are sometimes chlorinated, and because users have different style preferences. ACK developed a hollow membrane fibre filter and began selling it in urban and peri-urban regions in 2013.

Both the biosand and membrane filters are sold by Community Development Entrepreneurs (CDEs), with monitoring and support from Community Health Promoters (CHPs). In 2014, ACK began working with Savings and Credit Cooperatives (SACCOs), who have thousands of members. SACCOs assist with filter promotion, and offer loans to make filters more accessible to SACCO members. This initiative is financed by a combination of filter sales, carbon credits, and funding from ACI headquarters.

### Who's Engaged?

Group / Organization	Creating Demand	Supplying Products & Services	Monitoring for Improvement	Building Capacity	Financing
					
<i>Aqua Clara Kenya (ACK)</i>	✓	✓	✓	✓	✓
<i>Community Development Entrepreneurs (CDEs)</i>	✓	✓	✓		
<i>Community Health Promoters (CHPs)</i>	✓		✓	✓	
<i>Savings and Credit Cooperatives (SACCOs)</i>	✓	✓			✓
<i>Climate Care (carbon credits)</i>			✓		✓

## Case Study Details



### Creating Demand

ACK raises awareness and creates demand for its products through Community Development Entrepreneurs (CDEs) and Community Health Promoters (CHPs). These groups have different roles and functions.

Community Development Entrepreneurs (CDEs) are individuals recruited by ACK or by Savings and Credit Cooperatives (SACCOs). Each CDE is responsible for marketing, constructing, and selling water, sanitation, and hygiene (WASH) products to end users. ACK currently has about 26 CDEs, and plans to increase this number in 2017–2018.

Community Health Promoters (CHPs) are women who live in the areas where filters are sold. They are recruited by ACK and are responsible for education, monitoring, and follow-up with end users of WASH products.

#### Original Model: School-Based Promotion

Initially, each small business, run by a CDE, was based at a rural school. ACK selected one school per sub-location so that the CDEs had different markets for their products. At these schools, ACK staff and the CDEs would promote and distribute the filters and other WASH products.

The school-based approach struggled to generate sustained demand for several reasons:

- CDEs quickly exhausted their circles of influence (friends and family) and sales dropped dramatically. It was difficult to motivate CDEs to find a long-term market for their products.
- Materials often went missing from schools. Due to staff turnover at the schools, new head teachers were not always supportive of the program and sometimes failed to securely store the products and materials.
- Once ACK stopped subsidizing filters in 2013, the majority of customers could not afford to pay the full price in one instalment.



School launch event (2011)

#### Current Model: SACCO-Based Promotion

In response to the challenges above, ACK began working with Savings and Credit Cooperatives (SACCOs). ACK signs agreements with large SACCOs to sell household water filters and other products, including rainwater catchment systems, handwashing stations, and safe storage containers. As of July 2016, ACK has been working with one large SACCO, and has signed a partnership agreement with a second SACCO. ACK plans to expand to at least one more SACCO in the next few months. These SACCOs have combined membership of over 100,000 people. This is a much larger market than ACK could reach through its school-based promotion. ACK also retains some of the original CDEs who sell products outside of SACCOs.

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya



CDEs promoting membrane filters at a community function (2016)

A full-time ACK staff member works as a sales coordinator for each SACCO. CDEs are recruited by SACCOs and trained by Aqua Clara Kenya. Each CDE works within a specific area as a sales representative for either the biosand filter or the membrane filter. Typically, the biosand filter is promoted in rural areas, and the membrane filter is promoted in urban areas. CDEs are not paid a salary, but receive a 10–20% commission for each of the items sold and for follow-up with customers.

CDEs organize meetings and promotional events through their SACCOs. They use promotional materials provided by ACK, such as posters, flyers, and banners. These materials highlight the benefits of water filters and other WASH products. ACK hopes to increase the water and sanitation products they sell within SACCOs. As demand increases, ACK plans to expand to selling latrines, simple rope pumps, and other products.

### Lessons Learned: Creating Demand

ACK found it much easier to create and sustain demand for its products when it moved from school-based to SACCO-based promotion. By promoting their products in SACCOs, entrepreneurs have access to a large market and can easily offer financing options to their customers.



### Supplying Products and Services

ACK staff manage the supply chain for all components of their filters, which are sold through CDE representatives in SACCOs. ACK delivers filters to CDEs through SACCO branches. CDEs and CHPs provide filters and services to end users.

### Biosand Filters (BSFs)

Biosand filters are produced locally from sand, gravel, tubing and 75-litre plastic buckets. All of these products are commonly used in Kenya and are available in local markets. ACK negotiates with local suppliers, so the cost of the filter is as low as possible for the end user. Most materials for the BSFs are purchased near ACK's production facility in Kisii; however, ACK purchases filtration sand that is sieved at a rock crusher in Nakuru and transported by truck to Kisii.

BSFs are priced at US \$20–30. This covers the material cost and transportation of the filter, and provides the CDE with a commission of US \$3–4 per filter



ACK demonstration plastic biosand filter (2011)

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya

sold. CDEs also sell safe water storage containers for US \$4; 80% of households that purchase a biosand filter also purchase a safe water storage container.

### Membrane Filters

As its program grew, ACK recognized that the BSF was not suitable for people living in urban or peri-urban areas with a chlorinated water supply. BSFs do not work well with chlorinated water because the chlorine kills the organisms in the biolayer that help remove pathogens from the water. In addition, some customers in urban areas thought BSFs looked unappealing. To meet demand in these regions, ACK began supplying membrane filter units in 2013.

Membrane filters are made from hollow fibre micro-filtration cartridges, plastic buckets, pre-filter screens, and plastic taps. The three-inch membrane filter cartridges are imported from Japan. The other components are sourced locally. All of the components are packaged into a branded box for easy transport and sale.

Membrane filters are priced at US \$35–50. While the BSFs are priced for cost recovery, the membrane filters generate a small profit to support other parts of ACK's work. ACK is currently experimenting with more expensive and attractive filter models, which use a more modern container imported from China. This may make the filters more desirable; ACK has learned that despite the price increase, most households prefer a more visually attractive filter.



ACK has recently upgraded its membrane filter to a more visually appealing version (2016)

---

*“You would think the biggest concern of low-income households would be the amount of money a product costs. But if they are not excited about how it looks, they may not be willing to purchase it even if the price is very cheap. Now, if you make a product they are really excited about, they are willing to do whatever it takes to get that product in their homes.”*

*~John Nyagwencha, CEO of ACK*

---

### Sales Methods: Biosand and Membrane Filters

The full cost of the filters is often too much for customers to pay in single instalments. One of the benefits of selling filters through the SACCOs is that SACCO members can apply through CDEs for small loans to purchase the filters in instalments. SACCOs charge buyers a small amount of interest for each product purchased on credit, and pay ACK when it delivers products to the SACCO.

CDEs deliver the membrane filters during SACCO group meetings. This gives them an opportunity to train customers on how to install and use the products.

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya

CDEs construct BSFs and install them in people's homes. ACK gives CDEs the tools and materials necessary for their first 20–25 filters. As the CDEs sell filters, they repay money into a material resupply account. Once they have sold their first batch of filters, the money collected is used to order the next batch of filters.

### Supplying Services

CDEs train end users on how to use the filter, maintain it, and store treated water safely. CDEs also provide users with a phone number they can call if they have any questions about the filter.

CHPs also provide services: they help educate filter users and monitor filter use, as described in the following sections. At a monthly meeting, CHPs receive the details of sales made by the CDEs in the previous month. These are the households the CHPs must visit or call before the next meeting. The CHPs receive a stipend for each follow-up visit or call they conduct.

### Lessons Learned: Supplying Products and Services

In the early years of the program, ACK had high turnover of CDEs. When users had questions or concerns about their filters, they did not know who to contact if their CDE representative had moved on. To address this, ACK now provides a customer care number so users can reach ACK staff at any time, even if their original sales representative no longer works with ACK.

As they learned more from their customers, ACK recognized the importance of having different products available to meet demands of different customers. They now offer BSFs in rural areas, membrane filters in urban areas, and more expensive filters for those seeking a more attractive unit for their homes. Providing financing options through SACCOs has also helped households access these products.



### Monitoring for Improvement

#### CHPs as Monitoring Agents

CHPs are women recruited from the local community to help promote good WASH practices alongside the products for sale. ACK uses women as CHPs because they have better access to the women in the households and often can collect more honest responses. CHPs, like CDEs, are chosen through the partner SACCO network. SACCO branches publicize CHP opportunities, using posters and announcements during SACCO meetings. Those interested, mainly SACCO members, make their application and are interviewed. CHPs are chosen based on local residency, enthusiasm and interest in WASH, ability to visit different homes, and ability to communicate. CHPs are not ACK staff, but receive stipends for conducting specific activities, such as follow-up visits and education sessions. Each CHP supports the work of one or two CDEs.

CHPs receive field kits with the following materials: ruler, notebook, binder, one-liter container, ACK brochure, three CAWST games, CAWST WASH posters, CAWST household water treatment posters, Prescription for Health DVD, and ACK's biosand filter manual. They are also provided with bags, t-shirts and lanyards to increase their credibility in the community. Items are added to this kit on a regular basis. CHPs are also given a filter for their own home so they understand how to use and maintain it.

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya

CHPs make household visits or phone calls to check on the filter's physical condition, household knowledge of filter use, and safe water storage. During their visits or calls, they also train people on simple hygiene and sanitation improvements.

The CHPs use the following schedule to follow up with households:

- First visit or phone call – one to two months after filter installation
- Second visit or phone call – one year after filter installation
- Third visit or phone call – two years after filter installation

### Monthly Meetings and Quarterly Evaluations

ACK staff use monthly meetings with CDEs and CHPs to share monitoring findings and discuss common challenges and lessons learned. ACK also conducts quarterly evaluations for CHPs and CDEs to identify gaps in their knowledge and skills.

Staff use information from monthly meetings and quarterly evaluations to determine what should be done next to improve the program. They address common issues through discussions at monthly meetings, refresher training sessions, and in-person mentorship and support.



Community Health Promoters at a monthly monitoring meeting (2011)

### Lessons Learned: Monitoring for Improvement

From the CHP calls and visits, ACK knows that filter use and retention rates are very high for filters installed in the last three to four years. There were some issues with filters installed around 2009–2010 because many of the CDEs and CHPs responsible for follow-up with those users had moved on. Without knowing who to contact, some of those households stopped using their filters. Now, ACK provides a customer care number to call, and they are working to check in with all of the past customers from the early years of their program.

ACK's filter distribution model has changed over time in response to feedback and monitoring. The biggest change was the shift from working in schools (where CDEs found it difficult to sustain demand) to working with SACCOs.

During quarterly evaluations and monthly meetings, ACK staff often received requests from the CDEs for sales support. Initially ACK was hoping that each CDE would be very independent in their daily operations. Now, ACK staff have adapted their approach: they provide materials, field support, and regular follow-up to ensure that the CDEs feel supported and connected.

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya



### Building Human Capacity

ACK is committed to capacity building of their staff, CDEs, CHPs, and community members. They see this as one of the best ways to ensure the long-term sustainability of the program. ACK program managers have also received training from CAWST to build the skills and knowledge required to implement the program effectively.

In addition to the steps described below, ACK hopes to begin offering training services to other organizations to help improve the overall quality of WASH projects in Kenya.

### Building Capacity of CDEs and CHPs

ACK staff provide training and support to all CDEs and CHPs. First, ACK recruits individuals through SACCOs, and interviews candidates to select motivated and dedicated sales agents. Next, all CDEs and CHPs participate in a training workshop. The training gives an introduction to ACK, local water issues, water treatment options, waterborne diseases, and safe water storage. Trainers also explain how the products work, how to install and maintain them, how to troubleshoot, and how to train end users.



Training CDEs for a new partner SACCO (2016)

After this initial training, the CDEs and CHPs begin working. For the first month, they are provided with a mentor—an experienced CDE or CHP who is respected by customers and is familiar with the different challenges a new CDE or CHP may encounter. This mentorship approach serves two purposes: it motivates and recognizes the skills of the experienced CDEs and CHPs, and it provides support to the new members of the team.

In monthly meetings, CDEs and CHPs share stories about their experiences and the challenges they face. ACK gives short training sessions for CDEs, focused on specific sales strategies and social marketing techniques. Breakout sessions for CHPs focus on follow-up with households (what questions to ask, how to ask them, and how to train household members effectively). ACK project managers review monthly meeting discussions to identify capacity gaps, and they deliver refresher training and mentorship to CDEs as needed.



CHPs helping each other assemble a household membrane filter (2016)

### **Building Capacity of End Users**

For membrane filters, CDEs train households during group meetings at the SACCOs. A CDE delivers the products during group meetings, and trains users on how to assemble the filters, how to do maintenance, and how to contact ACK for support. In their follow-up calls or visits, CHPs also teach users about filter use, maintenance, safe water storage, and hand washing at critical times.

For BSFs, the CHP delivers training about filter use and maintenance during installation at the household, and during follow-up visits or phone calls.

### **Lessons Learned: Building Human Capacity**

When ACK was working through schools, CDEs often stopped working and lost motivation after they exhausted their market of close friends and family. This created two challenges for ACK:

- ACK needed to train new people to fill the empty positions
- End users could no longer contact their CDE for support.

ACK has learned that building capacity of entrepreneurs requires more time and ongoing communication than they initially expected. ACK provides as much support as possible to encourage CDEs, for example, by accompanying them to meetings, providing mentors for their first month, and helping them troubleshoot.

End users often forget the steps to follow for filter maintenance or they call ACK for support because they are not confident about the use and care of their products. To address this issue, ACK plans to create a new manual with easy-to-read graphics showing how the filter works and how to care for it.

### **Financing**

ACK's household water treatment initiative is almost fully market-based. As of May 2016, the ACI headquarters in the USA still covers salaries for ACK's 11 staff members. ACK hopes to be self-sustaining and is gradually decreasing the amount of support required from headquarters.

All other funding comes from two sources: profit from product sales, and carbon credits.

#### **Profit from Product Sales**

ACK makes a small profit on each sale of their household membrane filters. In addition, ACK has two types of institutional-size membrane filters, which they sell to hospitals, schools, and businesses. These institutional-size filters are sold at a higher profit margin, and profits are used to support the organization's running costs.

#### **Carbon Credit Financing**

After a three-year process, ACK obtained carbon credit financing for its filter program from Climate Care. Many of the households who filter their water with ACK products previously boiled water every day. Providing these families with filters has reduced carbon emissions from burning fuel to boil water. Climate Care provides ACK with carbon credits, based on the amount of water being filtered daily by households with ACK products.



## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya

To get carbon credit financing, ACK went through a lengthy and expensive process of collecting, sending, and revising relevant information, such as:

- Measurement of emissions from boiling within households
- Documentation of the number of households reached and their continued use of the filters
- Measurement of amount of water filtered in households

ACK hopes to increase the number of filters sold, which will increase this revenue stream. The data collection required for this financing program has strengthened ACK's monitoring processes.

### **Lessons Learned: Financing**

ACK acknowledges that getting carbon credit financing has been a challenging and lengthy process. They recommend that other organizations only pursue carbon credit financing if they have a large enough distribution system to make it worth the time investment. The market for carbon credits is also somewhat uncertain, and sustained funding of this type will depend on a favourable political climate for carbon financing.

### **Aqua Clara Kenya: Summary of Lessons Learned**

- Multiple technologies provide greater access to diverse markets; the biosand filter is sold in rural areas, and another technology (hollow fibre membrane filters) was added for urban and semi-urban areas with chlorinated water supplies.
- Shifting from schools to Savings and Credit Cooperatives (SACCOs) provided a larger and more sustained market, along with better access to credit and loans for customers.
- Community Development Entrepreneurs (CDEs) require long-term support to feel confident and perform their jobs effectively. Mentors help greatly in the first month.
- Getting carbon credit financing is a lengthy and expensive process and is only worthwhile with a large distribution system.
- Getting to know the customer and understanding what they want and are willing to pay is very important.
- When high staff turnover exists in your organization, create an easy way for customers to contact someone if they need support.

### **Further Information**

The information above is based on personal communication with John Nyagwencha (May and August 2016), and with C. Rumpsa and S. Rumpsa (August 2011).

For more details about Aqua Clara's work, visit: [www.aquaclara.org](http://www.aquaclara.org)

## HWTS Implementation Case Study: Biosand Filters and Membrane Filters in Kenya

---

CAWST (Centre for Affordable Water and Sanitation Technology)  
Calgary, Canada  
Website: [www.cawst.org](http://www.cawst.org) Email: [support@cawst.org](mailto:support@cawst.org)  
Last Update: April 2017

---

This document is open content. You are free to:



- Share – Copy and redistribute the material in any medium or format
- Adapt – Remix, transform, and build upon the material for any purpose, even commercially



Under the following terms:

- Attribution – You must give appropriate credit to CAWST, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests that CAWST endorses you or your use. Please include our website: [www.cawst.org](http://www.cawst.org)

CAWST and its directors, employees, contractors, and volunteers do not assume any responsibility for, and make no warranty with respect to, the results that may be obtained from the use of the information provided.