

Microfinance partnerships to improve access to durable water filters: results from six pilots in India and Cambodia

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ABSTRACT

PATH collaborated with manufacturers and microfinance institutions (MFIs) in India and Cambodia to test the impact of consumer finance models on uptake and use of household water filters. Six pilots were implemented using different filters, partners, and loan plans. The pilots predominantly reached households from the middle three country-specific wealth quintiles. Purchase rates ranged from 5 to 44% among MFI members and increased with household wealth quintile. Cost recovery for the pilots ranged from 33 to 109%. The results suggest that MFI loans can have the potential, in certain contexts, to provide an effective and commercially sustainable means of increasing uptake of water treatment solutions for MFI member households.

Key words | Cambodia, household water filters, HWTS, India, microfinance, monitoring and evaluation

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INTRODUCTION

Diarrheal disease is the second leading cause of death for children under age five worldwide, killing over 800,000 children per year (Liu *et al.* 2012). Poor access to safe drinking water and sanitation drive the diarrheal disease burden in developing countries (Prüss-Üstün *et al.* 2008). Household water treatment and storage (HWTS) improves water quality and reduces transmission of waterborne diseases (Fewtrell & Colford 2004; Clasen *et al.* 2006; Waddington *et al.* 2009; WHO 2013). HWTS has been widely promoted during the past decade as cost-effective health intervention, yet adoption has remained low in most countries, particularly among populations most vulnerable to diarrheal disease (Clasen 2009). To improve uptake of HWTS, the PATH Safe Water Project (SWP), a five-year initiative funded by the Bill & Melinda Gates

Foundation, focused on market-based approaches for improving access to effective HWTS products for low-income households. One of the most promising approaches tested was providing microfinance loans to stimulate uptake of durable water filters.

Microfinance has long been used as a mechanism to reduce poverty by providing small-business loans to the poor. Some MFIs have offered savings and loan products for health care and education (Leatherman & Dunford 2010). Evaluations of the effect of microfinance on health outcomes support integration of microfinance and health services or products (Odell 2010; Leatherman *et al.* 2012). A few studies document the use of MFI loans to increase uptake of health-related products, such as insecticide-treated bednets (Tarozzi *et al.* 2011) and water filters (Freeman *et al.* 2012).

HWTS manufacturers face many obstacles and have few incentives to reach rural and low-income markets. Distribution to rural areas is costly, and households spend little on items they do not consider essential. Yet many manufacturers are interested in reaching the rural poor with HWTS products. Ceramic and biosand filters have the most potential for long-term use (Sobsey *et al.* 2008) and are preferred over other HWTS products (Albert *et al.* 2010). The effectiveness of water filters to remove enteric pathogens depends on the type of filter and the quality of the manufacturing. Ceramic water filters that are of high quality show proven reductions in bacteria and protozoa and have been shown to reduce diarrheal disease up to 60–70% in studies (CDC 2013). The SWP microfinance model aimed to provide cash-poor customers with access to a product they cannot afford in a single payment. It may also allow manufacturers to reach low-income and rural customers cost-efficiently and sustainably.

Between 2008 and 2011, PATH's SWP partnered with private manufacturers and MFIs in Cambodia and India to test: (1) the impact of a variety of microfinance loans on the uptake and use of household water filters; and (2) sustainability of the models, measured by cost recovery for the implementing partners. This article describes the results of six pilots implemented through these partnerships.

METHODS

In the pilots, MFI clients attended group sales meetings to learn about the importance of clean drinking water and watch a water filter demonstration. Clients interested in purchasing the product could then apply for an MFI loan. The manufacturer then delivered the product to customers with approved loans, and locally recruited salespeople trained customers on proper use and provided after-sales support through home visits.

Between 2008 and 2011, PATH initiated six pilots in four locations: the states of Tamil Nadu, Madhya Pradesh, and Andhra Pradesh in India, and Kampong Speu Province in Cambodia. In Tamil Nadu and Madhya Pradesh, Hindustan Unilever Ltd (HUL), maker of the PureIt water filter partnered with Spandana Sphoorty Financial Ltd (Spandana), one of India's largest MFIs. In Andhra Pradesh, Eureka Forbes Ltd, maker of the Aquasure Extra water

filter, partnered with a smaller MFI called Pragathi Sewa Samiti (PSS) supported by ACCESS, an organization which provides loans and technical assistance to MFIs. In Cambodia, the pilot was implemented with Hydrologic, a social enterprise manufacturing ceramic water pots, and VisionFund Cambodia, the microfinance subsidiary of World Vision International.

Each pilot tested whether promoting and distributing filters through MFIs is financially sustainable for MFIs and manufacturers, and increases uptake and continued use of the product. The target groups for the pilots were defined as the middle three wealth quintiles in each country. The majority of MFI clients fall in this group; it is rare that MFIs serve the very poorest who cannot afford durable products offered through commercially sustainable models, even with an installment plan. We measured household wealth status using an index based on ownership of durable assets and housing quality characteristics. We applied to these indices the wealth quintile benchmarks of India's National Family Health Survey – Round 3 (IIPS & Macro International 2007) and the Cambodia Demographic and Health Survey 2010 (National Institute of Statistics 2011) to place the households in our surveys in the relevant country-specific wealth quintile. This allowed us to measure the relative wealth status of the populations in the pilots compared to the country as a whole.

In developing the six MFI pilots, we employed an iterative design, in which lessons from one pilot were incorporated into the next. This allowed the pilots to build on one another so that we saw a progression of learning, culminating in our most successful MFI pilot in Cambodia.

The research activities described in this paper have been reviewed by the Institutional Review Board at PATH and considered exempt under the criterion described in the United States Code of Federal Regulations 45CFR46.101 (b)(2).

Pilot models

Each pilot was implemented in a different district. Table 1 summarizes the pilot details.

The amounts in USD use the prevailing market exchange rates at the time of the study and do not reflect purchasing power parity.

Table 1 | Microfinance pilot variations

Product partner	Hindustan Unilever Ltd				Eureka Forbes Ltd	Hydrologic
Product and price	PureIt; 2,000 INR (45 USD)				Aquasure Extra; 1,740 INR (39 USD)	Super Tunsai; 89,000 KHR (22 USD)
MFI partner	Spandana Sphoorty Financial Ltd				Pragathi Sewa Samiti (PSS) through the umbrella organization, ACCESS	VisionFund Cambodia
Location	Tamil Nadu, India; (Erode) Urban	Tamil Nadu, India; (Thirutani) Rural	Tamil Nadu, India; (Kanchipuram) Urban and rural	Madhya Pradesh, India; (Nagda) Rural	Andhra Pradesh, India; (Nellikuduru) Rural	Kampong Speu, Cambodia, Rural
Loan terms						
Loan amount	INR 2,000 (USD 45)			INR 730 (USD 16)	INR 1,740 (USD 39)	KHR 92,000 (USD 22.50)
Installment	INR 43 (USD 0.95) weekly	INR 43 (USD 0.95) weekly	INR 80 (USD 1.8) weekly	INR 39 (USD 0.87) and INR 37 (USD 0.82) weekly	INR 250 (USD 5.60) monthly	KHR 16,168 (USD 4) monthly
Repayment period	50 weeks	50 weeks	25 weeks	20 weeks (INR 39 for 17 weeks and INR 37 for 3 weeks)	6 months	6 months
Interest rate	8% p.a. flat rate	8% p.a. flat rate	Interest-free installments	18% p.a. flat rate	12% p.a. reducing balance rate with an upfront payment of INR 240	18% p.a. flat rate
Pilot duration	10 months	5 months	10 months	6 months	7 months	11 months

INR = Indian Rupee; KHR = Cambodian Riel; p.a. = per annum.

Tamil Nadu, India

Three of the pilots were in Tamil Nadu, where two loan schemes were offered in rural, peri-urban, and urban locations to explore which loan scheme was more attractive and in which type of location. A 50-week loan was offered in urban and rural branches, and a 25-week loan was offered in a peri-urban area to test uptake and loan preferences.

Madhya Pradesh, India

In response to the results from the Tamil Nadu pilot where replacement filter cartridges were considered too expensive for ongoing product use, the pilot in Madhya Pradesh fully

subsidized the cost of the filter offering it with a 17-week loan covering the cost of two filter cartridges. This pilot aimed to measure the effect of a full-cost subsidy for the device on uptake and sustained use and to determine whether cost defrayment could be recouped by the manufacturer through sales of replacement cartridges.

Andhra Pradesh, India

A subsequent pilot in Andhra Pradesh tested a different product and loan. The MFI used a PATH grant as a revolving fund to provide loans for the filter. Loan repayment was monthly rather than weekly, with partial upfront payment upon purchase. To stimulate demand, a promotional

campaign was launched in the pilot district to raise awareness about the importance of water treatment and safe storage in addition to brand promotions by salespeople hired from the MFI community.

Kampong Speu, Cambodia

The final pilot in Kampong Speu Province of Cambodia used the Tunsai ceramic water pot and an upgraded ceramic water pot called the Super Tunsai. The MFI partner, VisionFund Cambodia, provides small business and community loans in the region. This pilot attempted to test the combination of an improved product and a loan option, and extended VisionFund loans for Super Tunsai to non-MFI members.

Monitoring and evaluation

Surveys of potential users

Quantitative cross-sectional survey data collected from MFI clients at baseline and endline measured changes in uptake and use, including confirmation of use through direct observation. Uptake was defined as the purchase of the filter at any time during the pilot. Along with differences in implementation issues that affected uptake and variability in location-specific factors, the different pilot durations (between 5 and 11 months) limit the comparability of uptake among the six pilots. Confirmed use was defined as having a correctly assembled filter in the household with water in it. The survey sample sizes are summarized in [Table 2](#).

In Cambodia, the pilot generated demand for the filters beyond MFI clients, and the MFI extended loans to new customers who wanted the filter loan. To assess the impact of the pilot on uptake among the general population in the MFI pilot area, we compared households there to households in a comparable area where the pilot was not implemented (a neighboring district with similar socio-demographic profile). A rigorous randomized control trial design, that would have assigned individual consumers or villages in the same district to control and pilot groups, was not feasible in the context of the pilots, which concurrently tested the commercial and operational viability of the models.

We also measured a number of determinants of water treatment, such as felt need to treat. High felt need is defined as those who reported that their source of water was average or bad and also reported that it was ‘absolutely necessary’ or ‘good to treat’ drinking water collected from that source.

Longitudinal surveys among users

In Tamil Nadu and Madhya Pradesh, longitudinal surveys were conducted among respondents who purchased the product and had it in their home at the end of the pilot (during the endline survey round). In Tamil Nadu, a panel of 70 respondents was followed monthly over 12 months, and in Madhya Pradesh, a panel of 95 respondents was followed monthly over six months. This study monitored rates of correct and continued use and captured reasons for discontinuation of use or nonuse among purchasers. Longitudinal data were not collected in the other pilots.

Table 2 | Household surveys sample size (number of households)

Location	Tamil Nadu, India (Erode)	Tamil Nadu, India (Thirutani)	Tamil Nadu, India (Kanchipuram)	Madhya Pradesh, India (Nagda)	Andhra Pradesh, India (Nellikuduru)	Kampong Speu, Cambodia (MFI members)	Kampong Speu, Cambodia (households in pilot area)
Baseline	220	226	225	440	442	473	n/a ^a
Endline	177	198	195	402	393	589	1,380
MFI members covered by the pilot ^b	3,000–4,000			3,010	4,600	6,700	

^aA baseline survey was not conducted for this group.

^bThis number represents all estimated MFI members in the areas (e.g., MFI branches) covered by the pilots.

Routine tracking of sales, cost, and revenue data

Cost, sales, and revenue data were examined to determine cost recovery for each pilot. This information, along with the consumer survey data, and interviews with manufacturing and MFI partner staff, was used to assess commercial viability, sustainability, and partners' intention to scale up the model.

RESULTS

Need and perceptions around water treatment

The perceptions about water treatment need and practices at baseline varied across pilot sites (Table 3). In Madhya Pradesh, where 75% of households at baseline had high felt need, the main concern was water turbidity rather than microbial issues; and 81% of households there used cloth or sieve to treat their water on a regular basis. A similar pattern was observed in Andhra Pradesh where 66% used cloth or sieve. In the three Tamil Nadu sites, boiling was a more prominent treatment method: 34% in Erode, 57% in Thiruttani, and 23% in Kanchipuram. In Cambodia, 76% reported boiling. Knowledge about the type of water filters promoted through the pilots varied considerably at baseline, from only 4% in Madhya Pradesh to over 50% in two of the Tamil Nadu pilot sites.

The pilot sites that were considered to have the highest market potential for water filters (at baseline) were those

with relatively high rates of felt need to treat water, boiling, and knowledge about filters: these were Erode and Thiruttani in Tamil Nadu, and the pilot site in Cambodia.

Uptake and use

Uptake, measured through the MFI client surveys, ranged from 5% to 44% at endline (5 to 10 months after launch of each pilot) compared to less than 6% in each of the pilots at baseline (with 1% or less in four of the India pilots) (Table 4).

Uptake was highest (44%) in the Madhya Pradesh pilot where PureIt was given away for free with a loan for two cartridges. However, only half of households who had obtained the filter through this loan reported using it, and only 14% were observed using the device correctly at endline.

Uptake increased from 5 to 30% among MFI members in Tamil Nadu, where loans of 43 INR (0.95 USD) per week for 50 weeks were offered in an urban area. Reported use at endline was 21 and 18% of MFI households were observed using the device correctly.

In Cambodia, uptake rates increased from 6 to 43% among MFI clients. At endline, 39% of respondents reported using the water filter, and 32% were observed using it correctly. In our endline-only evaluation of uptake in the general population, uptake of the Hydrologic ceramic water filters was 21% among households in pilot areas, compared to 7% in the control area. Among households in MFI pilot areas, 17% reported using the filter at endline, and 15% were observed using it correctly.

Table 3 | Perceived need, practices, and knowledge of water treatment methods at baseline (% of households)

	Tamil Nadu, India (Erode)	Tamil Nadu, India (Thiruttani)	Tamil Nadu, India (Kanchipuram)	Madhya Pradesh, India (Nagda)	Andhra Pradesh, India (Nellikuduru)	Kampong Speu, Cambodia (MFI members)
Had high felt need to treat water	88	57	28	75	63	90
Used some form of water treatment ^{a,b}	93	86	42	97	95	95
Used boiling as water treatment ^a	34	57	23	6	22	76
Awareness of type of filter promoted	57	72	14	4	24	42

^aMethod used every day or almost every day.

^bIncludes: boiling, sieve, cloth, settle and decant, alum, chlorine, filters.

Table 4 | Uptake and use of promoted water filters (% of households)

Location	Tamil Nadu, India (Erode)	Tamil Nadu, India (Thirutani)	Tamil Nadu, India (Kanchipuram)	Madhya Pradesh, India (Nagda)	Andhra Pradesh, India (Nellikuduru)	Kampong Speu, Cambodia (MFI members)	Kampong Speu, Cambodia (households in pilot area)
Baseline uptake	5	1	0	0	0	6	n/a ^a
Endline uptake	30	7	7	44	5	43	21
Reported use at endline	21	7	2	21	3	39	17
Observed correct use at endline	18	5	<1	14	<1	32	15
Continued use among purchasers in longitudinal follow-up ^b	25			38	n/a	n/a	n/a

^aA baseline survey was not conducted for this group.

^bLongitudinal follow-up was conducted monthly for 12 months after endline for Tamil Nadu and 6 months after endline in Madhya Pradesh and was not conducted for the pilot in Andhra Pradesh and Cambodia.

Continued use

In Tamil Nadu, among households who had the filter at home at the time of the endline survey, 25% (across all pilots in that state) were using PureIt 12 months later, at the last follow-up visit. Among those who had discontinued use, 66% reported an exhausted filter cartridge as the reason to stop using the filter. When this happens, the device's auto-shut-off mechanism stops the flow of water until the cartridge is replaced; in a typical household, it needs to be replaced every five to six months. Among those who discontinued use because of an exhausted cartridge, 88% cited insufficient funds to replace the cartridge with 3% noting lack of availability of replacement cartridges.

The pilot in Madhya Pradesh intended to minimize the cost of replacing cartridges by fully subsidizing the cost of the device to the consumer and providing a loan for two replacement cartridges. Of the households who had PureIt at home at endline, 38% were using the filter six months later, at the last round of the longitudinal survey, and 35% had sold or given away the device. The remaining 27% still had PureIt at home but were not using it; the predominant reason these respondents cited was that there was no need to treat the water in this season (dry season): 75% gave that as a reason; while a few said that the device had broken. The survey found that turbidity (i.e., visible impurities) was the main water quality concern, especially during the rain season. These results, along with in-depth

interviews and focus-group discussions, indicated that a majority of target consumers who obtained the filter through the MFI offer regarded the product as having limited value except as a low-cost asset with an aspirational appeal to be sold or given away.

Uptake rates by wealth quintile

The population covered by pilot activities was concentrated in the middle three country-specific wealth quintiles: in five of the pilots more than 80% of MFI clients belonged to this target group, while in the Andhra Pradesh, India pilot this proportion was 61%. In the India pilots, very few or none of the MFI clients were in the lowest (poorest) quintile, and 7% of clients in Cambodia belonged to this quintile. Similarly, the share of MFI clients in the highest (richest) quintile was lower than in the general population in five of the six pilots.

The results on uptake within each quintile (or groups of quintiles), summarized in Table 5, indicate an overall wealth gradient in uptake in the pilots in India: purchase rates generally increase with wealth quintile.

Similarly, among MFI clients in Cambodia uptake at endline increases from 23% in the lowest quintile, to 40–45% in the second and middle quintiles, to 50–53% in the two highest quintiles. Comparing these results with uptake at baseline (8% or less in each quintile) showed that uptake among MFI clients increased more among the

Table 5 | Distribution of households targeted by the pilots by country-specific wealth quintile (% of survey household in each quintile at endline)

Asset wealth quintile:	Tamil Nadu, India (Erode)	Tamil Nadu, India (Thirutani)	Tamil Nadu, India (Kanchipuram)	Madhya Pradesh, India (Nagda)	Andhra Pradesh, India (Nellikuduru)	Kampong Speu, Cambodia (MFI members)	Kampong Speu, Cambodia (households in pilot area)
Lowest (Poorest)	0	2	2	0	0	7	7
Second	<1	5	3	<1	10	22	19
Middle	5	31	34	17	38	38	32
Fourth	57	57	53	64	44	30	37
Highest (Richest)	38	6	9	19	9	2	6

highest quintile than among the lowest quintile, although there was no consistent gradient in the pre–post difference in ceramic water purifier uptake across quintiles. The results were similar among households in the general population in the pilot areas. One notable difference in Cambodia was more substantial uptake in the first and second quintiles as compared to the India pilots.

Looking at the distribution of units sold across quintiles, we found that the vast majority of filters sold in the India pilots went to the wealthiest two quintiles; however, 43 to 75% of sales were in the fourth quintile (which reflects the share of this quintile in the MFI group, 44 to 64%). In interviews, manufacturers indicated that the amount of sales that occurred to consumers in the fourth quintile were viewed by them as a sign that they ‘reached down market’ to households poorer than their typical target segment, which is only the highest quintile. In Cambodia, the distribution of units sold across quintiles largely reflects the distribution of households, with a greater share of sales going to lower quintiles: 36% of units were sold to the third quintile and 23% to the second quintile.

Commercial viability

Commercial viability means a pilot partner recovers all costs through sales. We calculated total cost recovery by dividing total revenues received by all partners by the total costs they incurred for the pilot. This was done for each group of pilots implemented in a given state (i.e., four pilot groups) and included production, distribution, marketing and promotion, financing, and administration costs. PATH’s costs to design and monitor the pilots were excluded. A total

cost recovery greater than 100% indicates that the model has potential to be profitable at scale.

Full cost recovery was achieved in two of the four pilot groups – the weekly repayment terms approach in Tamil Nadu and in the Cambodia pilot. The Tamil Nadu pilots (combined) achieved 109% cost recovery. HUL is now scaling up the model with multiple MFIs, making improvements in program design based on the pilot lessons, and considering expansion to additional countries.

The Cambodia MFI pilot achieved 102% cost recovery. An independent audit of the final variation of the VisionFund Cambodia loan program, by APV (Cambodia) Co. Ltd, found that 100% of filter loans were in timely repayment at the time of the audit. Another benefit was that 65% of the filter loans made during the pilot period were to nonmember customers, thus saving VisionFund Cambodia money on growing its customer base. The MFI pilot performed better than Hydrologic’s direct-to-consumer and retail sales models. VisionFund Cambodia is scaling up the consumer financing program with Hydrologic in additional provinces, as well as adding consumer loans for latrines to their product mix.

The total cost recovery in the Madhya Pradesh pilot was 85%. However, by the time the evaluation concluded, households who purchased the filter would not have gone through the filter cartridges included in the package. Therefore, we could not measure cost recovery in the longer term, when sales of replacement cartridges could recover the filter giveaway subsidy.

In the Andhra Pradesh pilot, partners Eureka Forbes and PSS were unable to generate enough revenue from sales to cover distribution and marketing costs or overhead. The

pilot achieved 33% cost recovery due to repayment rates of only 40%, which likely resulted primarily from the MFI crisis that unfolded at the time and led to a dramatic decrease in repayment rates for MFIs (Maes & Reed 2012); overall repayment rates for PSS fell from 98 to 45% during the pilot period. Issues with the supply chain for replacement cartridges and post-sales service at the community level also contributed to the low cost recovery as negative word of mouth from the consumers encountering problems limited sales. This was Eureka Forbes's first partnership with an MFI, and despite the challenges, the company considered it a good start and established a dedicated staff position to handle partnerships with MFIs and NGOs as future distributors.

LIMITATIONS

The research results are limited by the short duration of most pilot studies (5 to 11 months). Results on uptake and especially on commercial viability could have been different in the longer term, after initial implementation challenges are addressed. The variations in pilot durations, implementation issues, and location-specific factors limit the direct comparability of results across pilots. Lacking control groups for the MFI clients, we are unable to exclude outside influences on pilot outcomes or attribute changes solely to project activities. The combinations of a multitude of pilot characteristics limited the extent to which we could single out with certainty specific pilot elements or contextual factors that drove or hindered uptake.

DISCUSSION

These pilots demonstrated that MFI loans can increase uptake of HWTS products among MFI clients. Some of the decline in correct and consistent use in the India pilots over time was often attributed to operational, product, environmental, and human factors. Those factors that can be controlled are being actively addressed by manufacturing and MFI partners in continuing versions of the model, leading to more promising rates of correct and consistent use in follow-up studies conducted in Cambodia, as well as in the scale-up efforts of manufacturing partners in both countries.

The Tamil Nadu pilots indicated that loans with weekly repayment and longer terms (1 year) are more attractive. The Madhya Pradesh pilot indicated that giving away a free filter results in high uptake that includes many who do not intend to use the filter. Qualitative research with consumers in this pilot indicated high rates of resale or giving the filter away (e.g., as a gift). Most of those who stopped using the filter over time did so because they did not feel the need to treat water all the time. In addition, it is possible that salespeople may have felt less need to emphasize safe water messaging or product information to sell the product. As a result, price subsidization had no impact on actual use. The need for greater emphasis on raising awareness for the need to treat water consistently was one of the lessons learned.

Qualitative research with consumers in the India pilot that offered a loan for the filter only indicated there could be a role for additional loans for replacement cartridges to ensure continued use. In addition, we learned that offering the loan to non-MFI clients could generate additional demand, as well as a notable increase in MFI membership.

MFIs vary in relationships with borrowers, systems for handling small loans, and levels of interest in reaching the poor or extending loans for consumer products. The size of the MFI matters; the smallest MFI in our project, PSS, could not have participated without an interest-free revolving loan fund from PATH. Being aware of these trade-offs and the ways in which each partner can complement the strengths or overcome the weaknesses of others is an important consideration and may allow for involvement of other group structures such as cooperatives, self-help groups, and bank-linked institutions.

Our pilots appeared to work best in locations where effective water treatment was already a norm, households had a high felt need for water treatment, regardless of actual water quality, and there was already substantial knowledge of the types of water filters promoted through the pilots. Locations where existing demand for water treatment is low are less likely to achieve the uptake rates seen in the most successful of our pilots, and also less likely to see high rates of use among those who purchase the filter.

The pilots in India and Cambodia demonstrated to partners that the MFI partnership model works. Although some of the MFI partners have stopped making consumer loans,

all of the manufacturing partners are scaling up the model with additional MFI partners independent of PATH support. Additional MFIs are now working with PATH and/or the pilot partners to implement similar loan schemes for other consumer products, such as latrines. As operational issues are resolved, partners expect an increase in sustained use.

MFIs rarely serve the very poor. This means that the models demonstrated through the pilots cannot reach the poorest consumers at scale. The public sector could leverage the reach of the private sector into communities where durable products such as water filters were not available. This could lead to testing the use of targeted subsidies to households that are not eligible or cannot afford to take a loan.

For two of the pilots in Tamil Nadu, in Erode and Thirutani, the duration of the pilots themselves (10 months) was shorter than the repayment period for the loan (50 weeks). It is likely that the high repayment rates by the time the evaluation was concluded are likely to continue through full repayment, so we believe that the results seen for these pilots are indicative of the model's performance in the longer term.

CONCLUSIONS

Our results demonstrated that the MFI model can be effective from a commercial viability and uptake standpoint. The pilot studies confirmed that providing credit and improving availability of HWTS products in underserved areas can reduce access barriers.

The MFI model can be used to stimulate uptake of other products that promote health. The introduction of one product, such as a water filter, can lead to increased openness to and interest in other health-related products, such as latrines and clean cookstoves. Group sales through existing MFI networks appear to not only streamline the sales process, but could create a normative environment that encourages water treatment among members.

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