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Public-Private Partnership Model for Point-of-Use Water Disinfection among Lower Income Households:

A DEMONSTRATION PROJECT IN UTTAR
PRADESH, INDIA

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Photo Credits: Special thanks to Mr. Amit Pasricha for all of the photos in this case study.

ACRONYMS

AED	Academy for Educational Development
DVD	digital video disk
EU	Eureka Forbes
GMP	good manufacturing practice
HUL	Hindustan Unilever, Ltd.
IAP	Indian Association of Pediatrics
IIPS	International Institute for Population Sciences
IMA	Indian Medical Association
NFHS-3	National Family Health Survey III
NGO	non-governmental organization
NRHM	National Rural Health Mission
ORS	oral rehydration salts
ORT	oral rehydration therapy
PACT-CRH	Program for Advancement of Commercial Technology – Child and Reproductive Health
PANI	People’s Action for National Integration
POU	point-of-use water disinfection
POUZN	Point-of-Use Water Disinfection and Zinc Treatment Project
PSI	Population Services International
RMP	rural medical practitioner
RO	reverse osmosis
SES	socio-economic status
SHG	self-help group
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
UP	Uttar Pradesh State, India
UV	ultra violet
WHO	World Health Organization

EXECUTIVE SUMMARY

The United States Agency for International Development designed the Point-of-Use Water Disinfection and Zinc Treatment Project (POUZN) to increase the availability and foster the sustained use of two proven interventions among caregivers of children. *Water treatment at the point-of-use (POU)* can reduce diarrhea caused by waterborne pathogens by 30 to 50 percent (WHO 2007). *Zinc treatment*, given during and after diarrheal episodes, reduces the duration and severity of diarrhea and also has a preventive effect against recurrence (WHO/UNICEF 2004).

This report focuses on the POU program in India, which was launched in 2006 and was initially envisioned as just a year-long demonstration. USAID field support continued through September 2010, and activities eventually reached four million people. The program was carried out in Uttar Pradesh (UP), India's poorest state, with a population of 180 million and among the country's highest rates of childhood mortality.

GOALS AND STRATEGY

The goal of POUZN in India was to demonstrate a comprehensive strategy addressing barriers related to *awareness, acceptance, availability, and affordability* of POU water treatment methods in order to increase their use among poor urban and rural populations and thereby reduce childhood diarrhea. The at-scale goal was to achieve 30 percent rural and 40 percent urban use of an effective POU method.

The project initially worked with the commercial sector and non-governmental organizations with micro-finance arms to establish commercially viable and scalable models for penetration of low cost, high

POINT-OF-USE TECHNOLOGIES

Water quality can be improved at the point of use via physical or chemical methods (or a combination of these in a multi-stage filter), exposure to sunlight or ultraviolet light, and boiling. Methods vary greatly in terms of price, ease of use, cultural acceptability (taste, smell), accessibility, and even environmental impact. Typical WHO-approved methods include:

- Boiling
- Solar disinfection (SODIS)
- Sodium hypochlorite (liquid bleach)
- NADCC tablets
- Sachets combining a flocculent and disinfectant
- Filtration via ceramic "candle" filters
- Filtration via bio-sand filters
- Multiple-stage filtration devices (using physical barriers, either chlorine or iodine and activated carbon)

Methods also vary in terms of effectiveness. WHO has established different levels of disinfection power according to the number of bacteria, virus, or other micro-organisms found per cubic milliliter of water. WHO requires a 3-log reduction of contaminants (or 99.9 percent). Multi-stage filters provide up to 7-log reduction of contaminants.

quality water purifiers among lower income groups. While filters were already widely used by higher income individuals in India, micro-finance was a new tool to make POU devices available and affordable to low-income users.

As the project expanded, additional partners joined the collaboration and POUZN sought ways to more aggressively offer additional POU products to families. Challenges in both the urban and rural arms of the pilot also led to changes in strategy. These included introduction of a water test kit to demonstrate water quality to communities in rural areas; negotiation of product commissions and other incentives for NGO distributors; and new approaches to reaching low income groups (such as distribution at village markets).

RESULTS

In the initial demonstration phase (2007-2008), the project worked largely through women's self-help groups (SHGs) and reached a total of 11,525 poor urban and rural families. According to project and NGO monitoring data of sales to SHGs during the pilot, 71 percent of families reported using some POU method (96 percent of urban families and 68 percent of rural families). Most were first-time users of any POU method. Overall, 47 percent reported using chlorine liquid; 19 percent reported using chlorine tablets; and 5 percent reported using filters (29 percent urban, 2 percent rural).

As the project expanded to additional districts, SHGs were not as common and the project relied on NGO staff to promote and sell products.

By January of 2009, the partnership between POU manufacturers and NGO partners was formalized through memoranda of understanding (MOUs) and the formation of an alliance known as the *Jal*

Mitra (Friends of Water) to expand reach and continue coordinating distribution and promotional activities and provide technical assistance to other alliance members. Additional MOUs expanded distribution of chlorine projects, and new filter manufacturers entered the market. Two are now producing much lower priced products that will be affordable to a larger percent of rural and urban slum families. Increased competition is also expected to reduce prices over time.

An unexpected outcome of the program was that the two collaborating NGOs both decided to create social marketing arms in their organizations, offering a small basket of branded products (POU products as well as zinc and ORS, which were being promoted by the other project activity under POUZN).

Through August 2010, the project reached 674,064 households—or approximately four million people—residing in 1120 urban slum areas and 1350 rural villages in UP. Sales data collected by project-supported NGOs for the final year of field support indicated that 21 percent of families reported using some POU method in both urban and rural areas. While sales rates were not as high as in the intense pilot phase, introduction of chlorine products was successful in both urban and rural areas (with 12 percent purchasing chlorine liquid and 8.4 percent purchasing tablets). Limited access to micro-credit among families prevented filter sales from reaching the same levels as during the pilot.

A quantitative study of 1400 households in October of 2010 showed even higher rates of reported POU use in both intervention and comparison areas, as compared to baseline data.

At the time of the baseline, only 2.5 percent of households (4.1 percent urban and 1.1

percent rural) reported *ever using* a POU method promoted by the project (boiling, disinfection products, or filtration). In contrast, the outcome evaluation found very high rates of POU use in both the intervention and comparison areas, with 96.8 percent of intervention households reporting they had *ever used* a recommended POU method, along with 71.0 percent of households in the comparison areas. The biggest difference between intervention and comparison districts was in the use of chlorine liquid for disinfection (56.9 percent versus 0.3 percent). No difference was found in the use of water filters (about 7 percent in both areas).

The evaluation found a dramatic difference in use of chlorine products in urban and rural areas of the intervention. Among urban households, 50 percent reported *current use* of chlorine tablets, vs. 3 percent of rural households. Conversely, 60 percent of rural households reported *current use* of liquid chlorine, vs. 11 percent of urban households. (Similar differences were evident in rates of *regular use*.) This clear preference for different products cannot be explained by any difference in intervention approach, and bears further investigation

Among those surveyed in the intervention areas who were *currently using* chlorine products, 32 percent said that their product was affordable, and 63 percent said they found it to be cheap. Of those who purchased filters, 27.5 percent said they had obtained a loan to purchase it, and about

three-quarters of those obtained their loans from an NGO.

CONCLUSIONS

The commercial and NGO sectors were willing to adopt a new business model together in this project in order to reach those below the poverty line. The role of a catalyst was essential in building the partnership. POUZN was able to build an enthusiastic alliance among partners that speak “different languages.” An engaged commercial sector was able to reach a substantial new market by partnering with NGOs and micro-finance institutions.

NGOs can be trained to become effective product demonstrators and micro-distributors. As an unbiased and trusted source, the NGO workers were able to provide information to SHGs about POU “in their own language” and were effective demonstrators and micro-distributors of products. Commissions on product sales offered an incentive to NGOs. This was boosted for some time by support for staff salaries. The long-term viability of NGO POU product distribution should be monitored, but looks promising given the decision by both project NGOs to establish social marketing arms.

Commercial partners are now expanding the model at their own expense elsewhere in India, and additional donors and international NGOs are also replicating the model in other states.

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I. INTERVENTIONS TO REDUCE DIARRHEAL DISEASE: USAID AND THE POUZN PROGRAM

Diarrheal disease is responsible for approximately 1.5 million deaths each year among children under five years of age—making it the second most common killer of children worldwide (WHO 2007). Nearly one in five child deaths is due to diarrhea. The toll is greater than that caused by AIDS, malaria, and measles combined. More than 80 percent of these deaths occur in South Asia and Africa.

Reducing this largely preventable burden of illness and death, which disproportionately strikes the poor, requires both prevention and treatment strategies. The United States Agency for International Development (USAID) designed the Point-of-Use Water Disinfection and Zinc Treatment Project (POUZN) to increase the availability and foster the sustained use of two proven interventions among caregivers of children. *Water treatment at the point-of-use (POU)* can reduce diarrhea caused by waterborne pathogens by 30 to 50 percent (WHO 2007). *Zinc treatment* given during an episode of acute diarrhea reduces the duration and severity of the episode and also has a preventive effect against recurrence (WHO/UNICEF 2004).

Over the long term, providing essential water and sanitation infrastructure—including toilets and safe, reliable, piped-in water to the household—is fundamental to preventing diarrheal deaths. One of the

Millennium Development Goals for 2015 is to “halve the proportion of people without sustainable access to safe drinking water and basic sanitation.”¹ For those whose water is unsafe today (whether due to poor water quality at the source, or contamination during collection, transport, or storage) access to and use of affordable technologies that can treat water at the household level can provide immediate protection and reduce the risk of diarrhea and other waterborne diseases.

Beginning in 2005, AED managed POUZN country programs for USAID focusing on both prevention and treatment interventions to reduce diarrheal deaths. POUZN/AED carried out work in India, Indonesia, and Tanzania to ensure sufficient supply and create demand for zinc treatment in conjunction with oral rehydration therapy (ORT). In India, POUZN/AED also worked to introduce point-of-use water disinfection practices in the state of Uttar Pradesh.

This report focuses on the POU program in India, which continued through November 2010.

¹ See <http://www.un.org/millenniumgoals/>

II. INDIA PROGRAM CONTEXT

VULNERABLE GROUPS AND HIGH NEED

India is home to an estimated 180 million children under the age of five. Child mortality has decreased nationwide since 1992 but remains high, at 72 per 1000 live births according to WHO Health Statistics 2009. According to the most recent National Family and Health Survey (NFHS-3) in 2006-2007, more than one in 18 children died within the first year of life, and an additional one in 13 died before reaching the age of five.

Diarrhea causes 18 percent of deaths among Indian children under age five—more than 386,000 children per year. This represents the largest number of deaths from diarrhea in any single country worldwide and more than one-fifth of global child mortality due to diarrhea.

Children in rural areas and urban slums are at especially high risk due to poor water, sanitation, and hygiene. At the time of the NFHS-3, only 12 percent of rural households had access to piped water, 16 percent used a public tap/standpipe, and 53 percent drew water from a tube well or borehole. These same households faced major hygiene challenges: only 10 and 44 percent respectively had “improved” sanitation such as a pit latrine with a slab. For families who had to collect or even simply store water before use—because of the irregular availability of piped water, for



Point-of-use treatment is lowest among those who would benefit most.

example—the likelihood of further contamination was very high.

At the same time, point-of-use treatment of water was very low among those who would benefit most. In rural areas, 73 percent of households said they did nothing to purify their water. Fifteen percent said they strained water through a cloth (which does not kill micro-organisms) and 8 percent reported that they boiled water. The number of people who performed these behaviors consistently was likely to be even lower.

MARKET ANALYSIS AND LESSONS LEARNED FROM OTHER POU EXPERIENCES

The disparity between rich and poor households with regard to water treatment is striking. Among middle and upper class Indian households, treatment is the norm.



Pureit, a multi-stage water filter sold by Hindustan Unilever, can sit on the floor or any level surface.

The Indian water filter industry estimates that the vast majority of rich and middle class households use POU devices—ranging from ultra violet (UV) filters to expensive reverse osmosis (RO) filters, to a range of multi-stage filters—while penetration among poor rural and urban slum populations is exceedingly low.

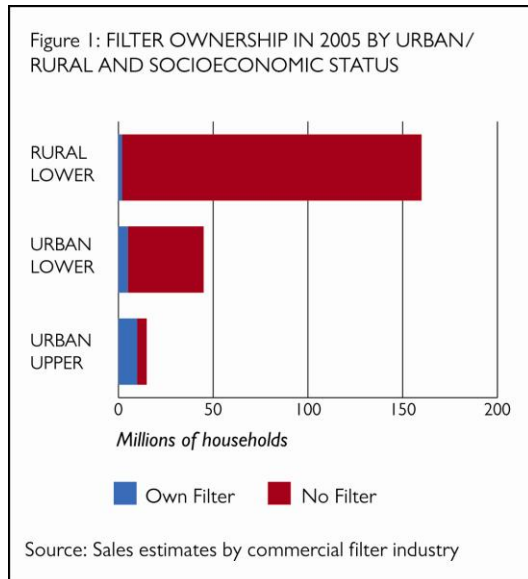
MULTI-STAGE WATER FILTERS

A multi-stage water filter is a floor or table-top device that does not require running water or electricity. Companies generally patent their technology. Hindustan Unilever’s product is called *Pureit*. Eureka Forbes has named theirs *AquaSure*.

The devices offered by the various POUZN partners all operate on the same gravity-fed principle. Water passes first through a membrane at the top of the filter to trap particles mechanically. Stage two is a proprietary chemical disinfection process using either chlorine or iodine. Stage three uses activated carbon to trap any remaining organisms and remove any chemical taste and smell.

Multi-stage devices offered by the project’s partners use disinfecting cartridges (costing about \$6.00) that need to be replaced every five to six months, depending on the amount of water filtered.

According to Indian POU industry estimates in 2005, 66 percent of India’s approximately 15 million urban rich and upper middle households owned and used at least one commercial filter (AED-POUZN). Among the approximately 45 million urban poor households, only five million used a filter. Among the estimated 160 million rural households, only two million owned any such device (see figure 1).



To address this disparity—and the urgent need for POU products and practices in households that are most vulnerable to diarrheal disease—AED submitted a proposal to USAID in 2005 to test a scalable model for increasing the supply and use of affordable, effective POU drinking water treatment methods in both poor rural and urban slum communities. This proposal was based on a preliminary assessment that several major commercial filter manufacturers could fulfill basic criteria for collaboration: i.e., nationwide reach, interest in reaching consumers below the poverty line, and a quality product that could function without electricity or piped water.

III. GOALS, VISION, AND INITIAL STRATEGY

The goal of POUZN in India was to address barriers related to *awareness, acceptance, availability, and affordability* of POU water treatment methods in order to increase their use among poor urban and rural populations. The driving principle of POUZN's model was to partner with POU companies that manufactured effective, affordable and user-friendly products, had the capacity for nationwide distribution and promotion, and were willing to market to the base of the pyramid. The at-scale goal was to achieve 30 percent rural and 40 percent urban use of a POU method.

SHORT-TERM CATALYST AND LONG-TERM COLLABORATORS

The project acted as a catalyst among partners with complementary strengths but little experience working together. India has a vibrant commercial sector including multiple producers of POU products interested in expanding their markets. However, distribution systems do not penetrate rural areas and the supply chains operate largely on a cash rather than credit basis—discouraging wholesalers and small-scale retailers from stocking new or slow-moving items. Non-governmental organizations (NGOs) with a strong presence in low-income communities can provide a bridge to potential new consumers. POUZN's initial strategy was to create a public-private partnership between commercial POU product manufacturers and NGOs that support women's self-help groups (SHGs) with micro-finance activities.

CHALLENGES IN THE TARGET AREA

Uttar Pradesh is one of USAID's three focus states due to low health and economic indicators. In POUZN's target area, drinking water indicators were below the national averages at the project's inception.

At the time of the NFHS-3 (2006-2007), only 37 percent of urban slum households and 1.2 percent in UP's rural areas had access to piped water; 62 percent of poor urban households and 90 percent of rural families drew water from a tube well or borehole. Nearly 8 percent of rural families relied on unimproved sources of water.

Project baseline research (conducted by IMRB) before expansion showed that about 77 percent of target households transported water in uncovered vessels and about 38 percent stored their water in uncovered vessels. With such high risk of contamination, only about 4.5 percent reported ever treating their drinking water (with any method); only 2.3 percent reported doing so within the previous 24 hours.

The project's vision was that access to loans, together with educational and promotional activities, would make POU devices accessible and attractive to members. These "early adopters" would in turn influence attitudes and practices among their neighbors. Given the current price of water filters, the inclusion of a micro-finance component was deemed critical not only for lower income users, but for filter manufacturers who were exploring sales to the huge and largely untapped lower SES groups.

By building on existing commercial and civil society resources and systems, POUZN's aim was to create a sustainable model that would benefit all partners—as well as consumers—and not require project inputs over the long term.

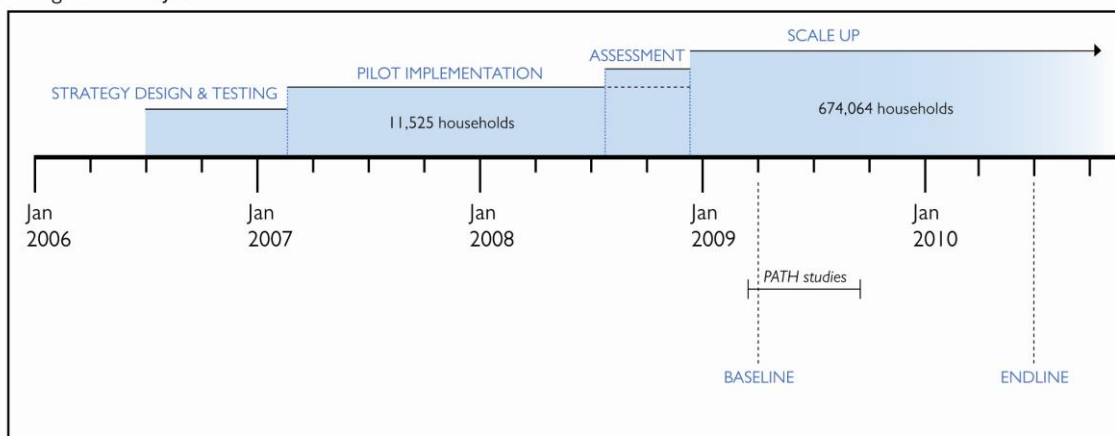
PILOT INTERVENTION AREA

The program was carried out in Uttar Pradesh (UP), India's poorest state, with a population of 180 million (nearly the size of Brazil) and among the country's highest rates of childhood mortality. Start-up sites included 1500 households in 35 urban slum areas in the capital city of Lucknow and 10,000 households in rural communities of Faizabad, Ambedkar Nagar, and Sultanpur districts.

PROJECT TIMELINE AND RESOURCES

The project, launched at the end of 2006, was initially envisioned as a year-long demonstration. Activities were managed by one full-time professional (with extensive NGO and micro-finance experience) based in Lucknow, the capital of Uttar Pradesh, and a half-time professional with expertise in private industry, located in New Delhi. USAID provided \$1.4 million in core and field support funding over four years. Leveraging of resources from both the commercial sector and NGO partners, however, was one of the program's key successes.

Figure 2: PROJECT TIMELINE



IV. PHASE I: EARLY IMPLEMENTATION

POUZN in India was based on a public-private partnership that evolved in fundamental ways over time because of effective feedback processes and the agility of its partners to change direction as evidence required. While the POU program centered on consumer needs, perceptions, and practices, it did not rely on expensive or time-consuming research. Program management focused on problem-identification and creative adaptation.

Vision for the pilot came from neighboring Nepal—and experience in communities geographically very close to the Uttar Pradesh intervention area. POUZN's project director had consulted on a POU and hygiene program² that offered constituents a choice of POU methods. The majority of women aspired to own a multi-stage filter (see box). However, price was an insurmountable barrier to most of the potential customers. POUZN was concerned from the start with issues of consumer preference, cost, and credit schemes for the poor.

IDENTIFYING PARTNERS

In early 2007 POUZN identified partners for both the supply and demand creation side of the pilot.

Commercial manufacturers. The first challenge was to interest national scale

² The Hygiene Improvement Project was funded by USAID and managed by AED. See <http://www.hip.watsan.net/>

SELF-HELP GROUPS IN INDIA

There are several million self-help groups in India, of which about 50 percent are formed directly by NGOs and take part in micro-credit activities.

Forward-looking women. A typical self-help group (SHG) includes 10-14 low-income women who regularly pool savings to serve as a guarantor for loans from banks or government programs. Members tend to be socially active in their communities. They usually meet twice a month to discuss income-generation schemes, decide who will receive loans, and track repayments. Meetings may also include educational activities.

Loans for POU products. POUZN worked with SHGs to determine a feasible loan payment plan for water filters costing Rs 2000 commercially. They settled on payments of Rs 200 every two weeks for a period of five months. During the pilot, loan repayment for filters was consistently 100 percent on time.

manufacturers of quality multi-stage filters in reaching low income populations. During the development of the proposal, POUZN contacted ten companies. All mentioned the prohibitive costs of extending infrastructure to rural areas and the necessity of operating on a cash basis with distributors. POUZN outlined in detail how the project would minimize their risks in marketing to those below the poverty line. Hindustan Unilever Ltd. (HUL), Usha Brita, and Eureka Forbes agreed to join the pilot.

NGOs and micro-finance institutions. The project short-listed six NGOs (both with and

without micro-finance arms) that supported self-help groups and invited them to submit proposals for POU activities. The project looked for NGOs that offered micro-credit, but considered pairing NGOs with separate micro-finance institutions (MFIs). Short-listing of MFIs was a challenge because many lend only for income generating purposes. In discussions with the most socially-active NGOs, POUZN emphasized the link between improved health and family earnings. Three groups embraced the project concept and POUZN assisted them in preparing budgets and reviewed details about their catchment areas. Two NGOs were selected: Pratinidhi to work in Lucknow's urban slums, and PANI in rural areas. The latter had an internal micro-finance branch, which made it convenient to extend credit to known SHG members. PANI did not have micro-finance capabilities but was willing to partner with an MFI.

Meeting and learning in the field. POUZN carried out rapid formative research with several SHGs to demonstrate multi-stage filters, gauge interest, and determine an acceptable price and loan arrangement for the target groups. A formal price sensitivity study was conducted later. These first visits convinced NGOs that the program was feasible. Similar demonstrations built confidence among the commercial partners. Sales representatives from both Hindustan Unilever Ltd. (HUL) and Eureka Forbes (EU) visited the field, demonstrated their devices, and spoke with SHG members. Typically in a group of 20 women, about 16 would express enthusiasm for the filter but only two could afford one at the asking price (Rs 2000 or about US \$40). After discussing loan schemes, six to seven more women were generally interested in buying a filter if one could be had for biweekly loans of Rs 200 paid over five months. Manufacturers saw with their own eyes the potential for capturing what amounted to 40 percent of a vast new market.

This give and take in the field was critical for NGO and commercial sector partners who speak different languages and are used to moving at different paces. NGOs are typically reluctant to act as "sellers" and industry is focused on the bottom line. Manufacturers are not inclined to spend time and effort "educating," and can be fearful of NGO "activism." By bringing the commercial and NGO partners together with SHGs, POUZN built trust and helped launch the partnership.

WORKING WITH SELF-HELP GROUPS

Communication materials and training. POUZN created communication materials appropriate for the mostly non-literate SHG members and trained NGO animators in their use. Early tools included placards and flip cards for group discussion, leaflets, and a large cloth "snakes and ladders" game depicting the causes of diarrhea and preventive practices. Later the project created banners, flip cards for home visits, and panels that could be hung on a bicycle for house-to-house promotion of products.

Education, promotion, and demonstration activities. POU activities were built into the rhythm of the SHG meetings and took three full sessions. The first focused on causes of diarrhea. The second focused on preventive actions including various POU treatment methods. The third included demonstrations of water filters, initially conducted by industry sales reps who could take orders on the spot.

POUZN soon recruited demonstrators from among the NGOs and the SHG members as well. The goal was that over time, SHG members would also become micro-distributors in their communities, earning a commission on each filter sold.



The project created various simple communication materials, including promotional placards for bicycles.

MONITORING

NGO monitors kept meticulous records of their self-help groups, which proved invaluable as a monitoring tool for the POU intervention. POUZN created a simple tracking sheet for POU activities. At each

session, data were collected about who had committed to use a POU method and who was still using it. The NGOs compiled data and sent it to the project each month.

V. STRATEGY REASSESSMENT

After about ten months, POUZN had reached all 1,512 urban and 10,013 rural households in the intended pilot area. Promotion, especially in urban slums, was promising and loan repayment rates for purchase of filters were consistent and on time. Nine percent of urban consumers and 1 percent of rural consumers had purchased filters. While the project was moving at a reasonable pace towards its goal of 40 percent urban ownership, it was not moving fast enough towards its goal of 30 percent rural ownership.

ADDING MORE PRODUCT OPTIONS

POUZN sought ways to offer additional POU products, given the slow pace of filter purchase, especially in rural areas. Population Services International (PSI) welcomed the opportunity to work with the NGOs to distribute their low cost liquid chlorine product, *SafeWat*. They agreed to charge Rs 7.45 for a 100 ml bottle (which can purify 1000 liters of water), and the NGOs then sold these to SHG and community members for Rs 10.00. In the first year, NGOs ordered 6500 bottles. Around this time Medentech, a global manufacturer and distributor of chlorine tablets, reached agreement with Wockhardt, a major generic pharmaceutical manufacturer, to market low-cost, high-quality chlorine tablets in India. POUZN quickly arranged with Medentech to acquire

one million *Aquatab* treatment courses (30 chlorine tablets that each purify ten liters of water) as samples. Medentech viewed this opportunity for promotion as a first step in creating demand for their product (which retails for Rs 15 per course in rural areas and Rs 20 in urban areas).

DISTINCT URBAN/RURAL CHALLENGES

Challenges in both the urban and rural arms of the pilot led to further changes in strategy. These challenges were quite distinct (see table 1 on next page).

Seeing is believing. While urban audiences were very concerned about water contamination, rural community members did not believe that their water was contaminated. Many people in rural areas assumed that their water was safe because it looked clear and often came from boreholes drilled by the Indian government—which is safer than surface water or shallow wells. It was very hard to convince these communities to treat their “clean” water.

Although families in both urban and rural areas understood that “dirty water” causes diarrhea, they also assumed that diarrhea is a fact of life for young children.

Table 1: Major Differences between urban and rural target groups

Factor	Urban poor	Rural poor
Awareness	More aware of links between safe water and health. Access to mass media.	Less aware of link between safe water and health. More difficult to reach.
Acceptance of messages	Water often looks unclean and poor water quality is a subject of frequent media scrutiny in the urban areas, so safe water messages are more readily accepted than in rural regions.	Many rural people believe (often correctly) that water at the source is clean. Water from hand pumps usually looks clear and smells/tastes good. Very little appreciation of the fact that water is often re-contaminated at the point-of-use.
Aspirations	Contact with rich or middle class households where they see POU methods and devices being used as the “norm” gives filters a high aspirational value.	Little opportunity to see anyone using POU methods or devices. Filters are not viewed as “the norm” and have less aspirational value.
Access to options	Chemical POU and filters are readily available. Distribution is not an issue.	POU products are not readily available. Small and dispersed communities make formal distribution difficult.
Access to loans	NGO/MFIs are largely absent. Families cannot complete the formalities for formal loans from manufacturers, distributors, or banks.	SHG members can get loans from SHG or NGO/MFI (although not as easily as for income-generating activities.)



Testing water at the source in a rural community.

POUZN introduced low-cost H₂S (hydrogen sulfide) water test kits to give communities visual evidence of their water quality (see box). This simple tool became a tremendous motivator, and the program shifted its basic educational/promotional strategy in rural areas from a six-week small-group exercise to a three-day community “fair.”

With the SHG as the entry point, the NGO animator contacted village leaders and arranged for a “water mascot” to parade through the village, announcing the time and place for the water-testing event. Meanwhile about 20 multi-point water samples were collected and coded to assure household anonymity. Samples were paired so that the quality of water at its source (stream, well, or tap) and at point of use could be compared. They were left with the village leader overnight to incubate at ambient temperature. The presence of contaminants in any water samples turned the strips inside the test kits black. On the third day, the NGO animator returned to publicly reveal the results. On average about 41 percent of rural and 68 percent of urban samples were contaminated at *source*, and 65 percent of rural and 82 percent of urban *household* samples were contaminated.



Water testing from multiple sites created a "teachable moment" about local water quality.

The tests provided a “teachable moment” about how even water that appears clear can still be contaminated, the importance of safe handling and storage practices, and the need for water disinfection at the point of use. On the fourth day, the animator went door-to-door promoting POU products. These visits had the added advantage of engaging husbands and mothers-in-law in decision making about adoption of POU practices.

Credit in the urban context. Unlike their rural counterparts, urban households were familiar with multi-stage water filters and aspired to own them because they could see how popular these are in middle and upper class homes. Nor was access to products the same challenge as in rural areas.

However, the transient nature of urban living means bonds between neighbors are not as strong and self-help groups are less common. Even less common is micro-finance support for such groups. Although POUZN selected Pratinidhi because of its strong involvement with the urban slum community, the NGO had little capital for micro-finance. POUZN promised to find a micro-finance institution to help capitalize them to provide loans for filters, but this took

A BEHAVIOR CHANGE TOOL FOR THE COMMUNITY

In rural communities a major barrier to adoption of any point-of-use water treatment method was the commonly held belief that local water was “clean.” POUZN found that public testing of multiple water samples with low-cost water test kits provided the evidence families needed to change their behaviors.

An H₂S (hydrogen sulfide) water test kit detects the presence of coliform bacteria, indicating that water is contaminated with fecal matter and is not safe to drink. The kit consists of a strip of paper impregnated with a reagent inside a small plastic or glass container. Water is added to the container and after 48 hours the strip turns dark gray or black if coliform is present. The tests are simple to use and enable communities and community health workers with minimal training to safely test their own water supplies.

Because the tests require a constant temperature of 25 to 35 degrees Celsius for optimum results, POUZN purchased two incubators for use during the cold season.

several months and delayed promotion (and in turn adoption) of filters in urban areas.

COMMUNITY AND NGO MICRO-DISTRIBUTORS

After POUZN worked for several months to build a cadre of micro-distributors from within the SHGs for outreach to their communities, it finally became clear that the NGO staff were better suited to this role. Most SHG members who tried to become micro-distributors lacked the salesmanship drive or the capacity to reach additional villages. NGO staff were more mobile and many of them developed selling skills.

Working with the manufacturers, POUZN negotiated commissions for each product. After the introduction of *SafeWat* and *Aquatabs*, NGO field staff started regularly carrying those products. In some rural

areas, small grass roots NGOs that partner with PANI also distributed the products. Each community had a primary NGO contact who was present at community mobilizations and conducted house-to-house visits. The NGOs provided a supervisor for each six or seven villages.

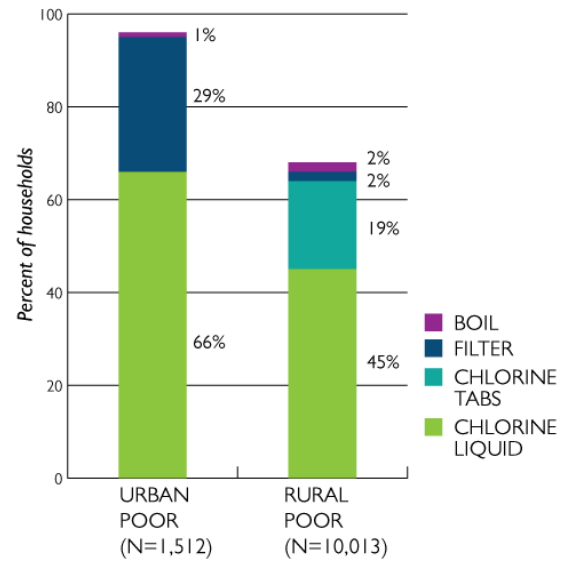
RESULTS OF THE PILOT PHASE

By the end of 2008 the pilot had reached 11,525 (1512 families in urban slums and 10,013 families in rural areas) in selected blocks of three districts.

Overall, 71 percent of families reached by project NGOs reported using some POU method (96 percent of urban families and 68 percent of rural families).

Use of specific POU method varied by location (see figure 3). Chlorine products were particularly popular. Filter sales were most successful in urban areas (29 percent use, compared with 2 percent among rural households).

Figure 3: USE OF POU METHODS BY POOR URBAN AND RURAL HOUSEHOLDS — DEMONSTRATION PHASE



Source: Monthly monitoring and sales data collected by project NGOs (September 2008).

VI. PHASE II: CONSOLIDATION AND EXPANSION

A RECOGNIZED PARTNERSHIP

By January of 2009, the partnership had expanded and gained sufficient solidity that members started to call it the *Jal Mitra*, or “friends of water” alliance. The early undercurrent of doubt and mistrust between the POU manufacturers and the NGOs was replaced by a sense of shared goals and enthusiasm.

Partners in the Jal Mitra Alliance, including marketers Hindustan Unilever Ltd., Medentech, PSI, and NGOs Pratinidhi, and PANI signed Memoranda of Understanding to:

- expand to more households and locations;
- provide technical assistance and other support to alliance members in their individual projects;
- promote household water treatment;
- coordinate their distribution and promotional activities and ensure an uninterrupted supply of all household water products approved by the alliance;
- raise awareness of the need for household water treatment among central and state government, development organizations, funding agencies, and other policy and decision makers; and

- advance understanding of the needs and behaviors of the target groups and share this information among other members.

NEW PRODUCTS AND NEW CREDIT SCHEMES

POUZN increased the POU products available in the intervention areas and encouraged private sector partners to come up with new and better options for products and marketing and distribution models. The program signed a memorandum of understanding with HUL to provide generic communication material, one *Pureit* filter to each micro-distributor as initial seed capital, and one *Pureit* with a 50 percent subsidy to each NGO staff member. Additionally, HUL agreed to appoint staff to the project and to provide a commission on sales on *Pureit* units sold.

Eureka Forbes announced plans to introduce POU devices costing about 1100 Rps. This product is an outcome of their interest in the project and their understanding of the huge market for low cost devices. Ion Exchange, another filter manufacturer who was reluctant to join earlier, decided to come on board the project in urban areas through Pratinidhi. In late 2009, Tata group came out with *Swach*,

a filter costing Rs 999. HUL followed (towards the end of the project) with a similar low priced filter, which was eventually added to the NGOs offerings. These new products have interjected competition into the market and prices can be expected to keep falling.

PSI expanded its collaboration with POUZN, agreeing to provide all liquid chlorine to the project, including a donation of 200,000 bottles of *SafeWat* chlorine. Medentech initiated steps to import the first tranche of a committed six million *Aquatabs* and agreed to contribute US \$70,000 of free products.

FURTHER SCALING UP

Going into the expansion phase, POUZN recognized that micro-credit and self-help groups were not as widely available across the rest of Uttar Pradesh as in the initial target area. Therefore, several other community approaches were used for reaching the target audience. These included Joint Liability Groups, Resident

Community Volunteers, and village *haats* (see below). Joint Liability Groups, similar to SHGs, are small groups of five to seven women formed by local micro-finance institutions; each member guarantees loans for the others. Resident Community Volunteers (RCVs) are elected through a consensus approach as representatives of Neighborhood Groups—small associations of about 25 women living in a slum. RCVs



Sales were highest during home visits.

THE RIGHT PRICE FOR A FILTER

With special funding from PATH, POUZN hired IMRB of India to carry out a price sensitivity analysis for multi-stage filters among low income urban and rural families. The study used the Van Westendorp price sensitivity model. This model asks four key questions:

- At what price is the product a bargain? (good buy for the money)
- At what price is the product too cheap? (quality would be questionable)
- At what price is it too expensive but you might still consider buying it?
- At what price it is too expensive and you wouldn't consider buying it?

Cumulative frequencies of the responses for all four questions are graphed. The “acceptable price range” (APR) is then defined as the range in which respondents consider the price to be neither “too cheap” nor “too expensive.”

For lower income families in urban areas, the study found that the APR for filters was Rs 1100 to Rs 1500. For lower income families in rural areas, the APR for filters was Rs 1063 to Rs 1110.

recruited into the project were remunerated with free water testing kits, starter chlorine tablets and liquid, sales commissions on filters, the opportunity to own a filter on installment, and the opportunity to become a micro-distributor for a manufacturer.

The program was expanded to a fourth district, Basti district (97 percent rural) where a network of grass roots NGOs (managed by original partner PANI) was able to saturate the rural areas. POUZN held an orientation so that product representatives could train the NGO field staff on their products and distribution models. The project also held several three-day on-the-job trainings at “fairs” for the newly appointed community workers and micro-distributors from SATHI, PANI, and Pratinidhi. During these events, 9 percent of target families in urban areas and 25

percent in rural areas purchased POU products, primarily during home visits following the community events. This highlighted the faster uptake that can be expected when family decision makers are present.

In 2009, SATHI's network of NGOs carried out activities in 750 villages in the Basti District. The project also expanded to urban slums in Kanpur and Allahabad.

Following a positive mid-term evaluation by USAID, the mission provided an additional \$724,000 for scaling up the model in 2009-2010.

NEW PROGRAM ELEMENTS

POU activities attracted the attention of other programs and funders. PATH contributed a grant of \$50,000 to carry out a price sensitivity study for multi-stage water filters (see box), as well as new marketing and credit schemes for the poor. These

Promotion in village markets. The weekly market, or *haat*, is the heart of rural life. The Indian government provides grant assistance for basic facilities (walls, roofs, sanitation, water), although conditions are poor, especially in eastern Uttar Pradesh. In a four-month pilot, NGO micro-distributors equipped with communication tools set up "water corners" in 16 *haats* where they offered drinking water purified with either *SafeWat* or *Aquatabs*. Approximately 11 percent of visitors to the water corners purchased one of the POU products during the pilot. NGO partners are continuing to include water corners as part of their rural activities.

Subsidy Schemes. PATH also provided POUZN with a grant to study various installment and subsidy schemes for multi-stage filters.

Pilot study A tested "hire-purchase" schemes. Under such a plan, an interested family receives a filter after making a down payment and then pays a fixed periodic "installment" toward gradual ownership of the device. POUZN's pilot provided filters supplied by interested manufacturers to determine the acceptability of various payment plans. Results varied for the different target groups. A weekly installment plan with a payment of Rs 50-75 proved feasible in rural areas. A monthly plan with payments of Rs 200-300 was more acceptable in urban areas. A nominal down payment of Rs 200 was found acceptable in both areas. The study suggested an interest rate of 10-15 percent.

Pilot study B offered loans to low income consumers in areas where no self-help groups were operating. Through a grant process to its partner NGOs, POUZN provided start-up for a revolving fund to provide credit to families wanting to purchase filters. The NGOs were responsible for checking on consumer credentials, delivering the filters, and collecting payments. During the first two-three months of operation, the initial 400 filters provided under the grant were purchased by families in the study area. Within eight months, over 700 filters had been purchased under the revolving fund scheme. The scheme remains healthy, but it is too early to know if/how long the funds will be sustained. The initial outlay of capital was not sufficient to distribute significant numbers of filters, but the pilot has shown the feasibility of this approach.

NEW NGO INCENTIVES AND COMMITMENT

As the project approached its fourth year, sales were still not reaching projected targets of 40 percent urban and 30 percent rural use of POU method. POUZN decided to provide short-term incentives to PANI and

Pratinidhi field staff in the form of salary supports. As the months went by, the potential for long-term success became more evident to both NGOs. Each decided independently to create social marketing arms within their organizations. Each now

offers a small basket of branded products: POU products as well as zinc and ORS, which were being promoted by the other project activity under POUZN, in addition to smokeless cooking stoves and solar lanterns.

VII. RESULTS

During scale-up, the project, reached 674,064 households—or approximately four million people. The project ultimately reached people living in 1120 urban slum areas and 1350 rural villages in UP. Results were measure via the project’s regular monitoring via NGO sales data, as well as through a household survey conducted by an Indian research firm.

MONITORING AND SALES DATA

Total sales data collected by the project-supported NGOs over the course of expansion indicated that, overall, 21 percent of families reported using some POU method in both urban and rural areas. (See figure 4.) While utilization was not as high as in the intense pilot phase, introduction of chlorine products in particular was successful in both urban and rural areas (with 12 percent purchasing chlorine liquid and 8.4 percent purchasing tablets).

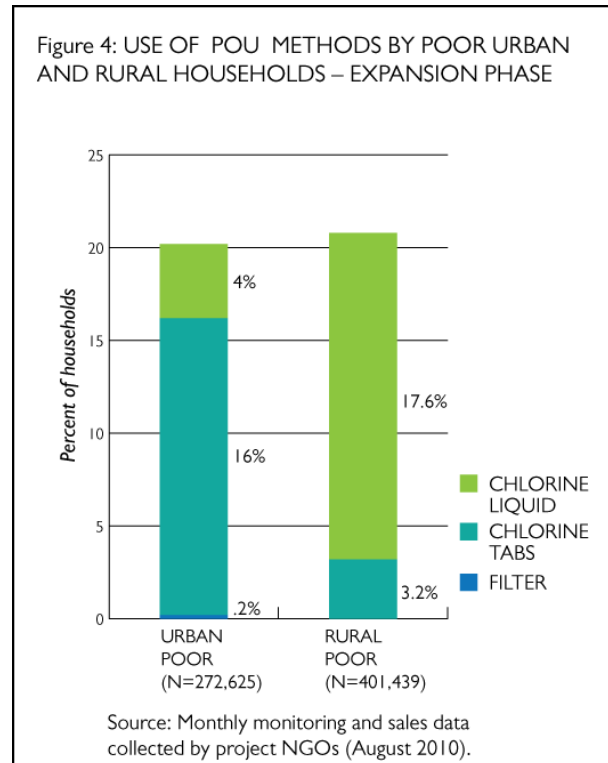
However, limited access to micro-credit among families who were not members of self-help groups prevented filter sales from reaching the same levels as in the earlier phase.

MEASUREMENT OF HOUSEHOLD POU USE

The project conducted an outcome evaluation in August 2010 in the intervention districts of Lucknow, Basti and Faizabad, as well as in the comparison district of Gorakhpur.³ Data were also compared with

³ The cross-sectional survey, conducted bthe Indian firm GfK-Mode, looked a sample of 1410 households using probability-proportional-to-size (PPS) multi-stage sampling methodology.

Figure 4: USE OF POU METHODS BY POOR URBAN AND RURAL HOUSEHOLDS – EXPANSION PHASE



those from a June 2009 baseline carried out in the intervention districts before full-scale project activity.⁴

At the time of the baseline, only 2.5 percent of households (4.1 percent urban and 1.1 percent rural) reported *ever using* a POU method promoted by the project (boiling, disinfection products, or filtration). In contrast, the evaluation in 2010 found very high rates of POU use in both the intervention and comparison areas, with 96.8 percent of intervention households reporting they had *ever used* a

⁴ The cross-sectional survey, conducted by the Indian firm IMRB, was carried out with 1100 households (500 urban and 600 rural) in the districts of Lucknow, Basti, and Faizabad.

recommended POU method, along with 71.0 percent of households in the comparison areas. The biggest difference between intervention and comparison districts was in the use of chlorine liquid for disinfection (56.9 percent versus 0.3 percent). No difference was found in the use of water filters (about 7 percent in both areas).

CURRENT AND REGULAR USE

POU methods must be used consistently in order to reduce the incidence of diarrhea. The evaluation therefore looked at rates of *current use* and *regular use*, in addition to *ever use* of a method.⁵

Over three-quarters (75.9 percent) of households in the intervention districts reported that they *currently used* at least one project-promoted POU method, compared to 22 percent of households in the comparison district. The difference was especially striking vis-à-vis the use of liquid chlorine, with 50 percent use rates in the intervention area and no current use in the comparison group.

Nearly half (48.9 percent) of households in the intervention districts reported using at least one POU method *regularly*, compared to just 5.3 percent of comparison households. While no comparison households reported using chlorine products regularly, 35 percent of intervention households used liquid products and 8 percent used tablets.

In general, in the comparison group, *urban* households were significantly more likely to have *ever used* a POU method than their *rural* counterparts. No such difference was found between urban and rural households in the intervention area. This may be attributable to POUZN's heightened focus

on the poor, regardless of urban/rural residence. However, in both the intervention districts and the comparison districts, urban respondents were significantly more likely to be *regular users* than their urban counterparts (in the intervention area, 65 percent as opposed to 45 percent). This suggests that gains made by the project in equity between urban and rural areas were not sustained at a “normative” level.

PRODUCT PREFERENCES

The dramatic rise in POU use rates—even in the comparison areas—over those at baseline may signal the influence of activities of other partners concerning diarrhea control and POU use specifically. For example, Water Aid was carrying out a POU program in Lucknow and Kanpur during this time. Nevertheless, differences with the between the intervention and comparison areas were substantial and likely indicate project effects.

Figures 5 and 6 (top of next page) provide information respondents gave about specific products *currently used* by them in urban and rural areas, respectively. The graphs show significant differences between intervention and comparison households in the use of all methods except filters. The figures also show the dramatic difference in use of chlorine products in urban and rural areas of the intervention. Among urban households, 50 percent reported *current use* of chlorine tablets, vs. 3 percent of rural households.

Conversely, 60 percent of rural households reported *current use* of liquid chlorine, vs. 11 percent of urban households. (Similar differences were evident in rates of *regular use*.) This clear preference for different products cannot be explained by any difference in intervention approach, and bears further investigation.

⁵ Respondents were asked if they had “ever used” a method; if they did, they were asked if they “still” use it (current use). Then they were asked about their frequency of use. Daily users were defined as “regular users.”

Figure 5: CURRENT POU USE IN URBAN AREAS

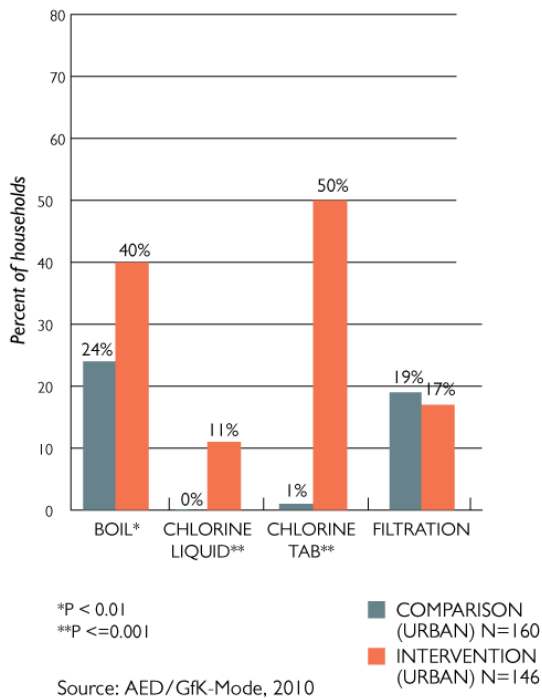


Figure 6: CURRENT POU USE IN RURAL AREAS

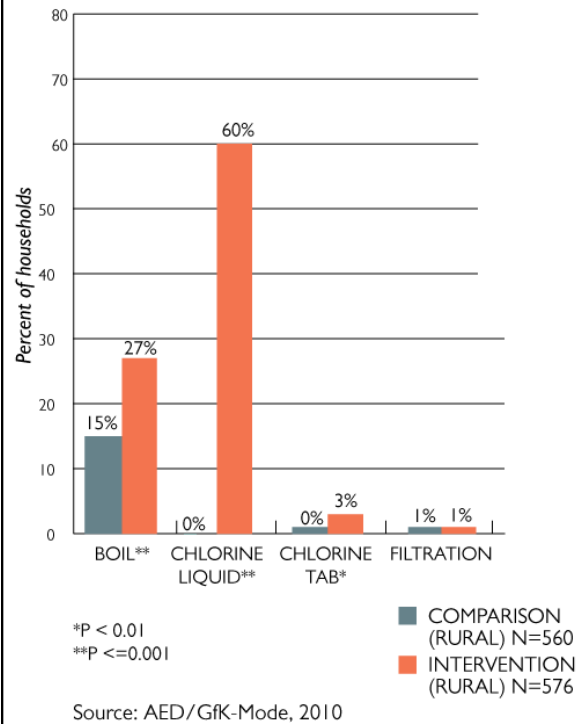
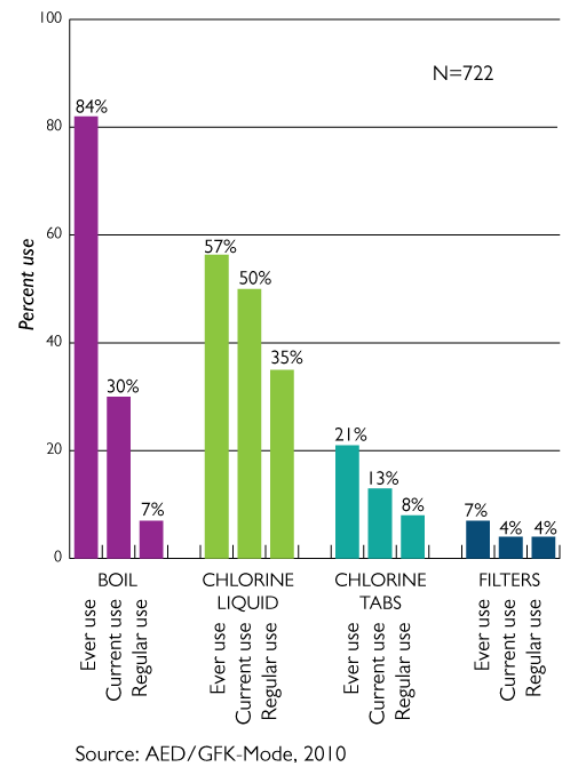


Figure 7 (right) shows the gaps between *ever use*, *current use*, and *regular use* for the various POU methods promoted. These patterns indicate the relative level of satisfaction users have, or the ease of use they associate with a method they have tried (assuming consistent access to it). Among those who *ever tried* a product, those using liquid chlorine were most likely to *continue* using and use it *regularly*. Least sustainable on a regular basis over time was the practice of boiling water.

KNOWLEDGE AND AWARENESS

In the baseline, less than half (46.7 percent) of households knew water should be treated and 38.9 percent could spontaneously identify at least one project-promoted POU method. The outcome evaluation found very high levels of knowledge: 98.2 percent of intervention area respondents could name a POU method, as could 89.9 percent in the comparison area. Again, differences according to location were interesting. In

Figure 7: FREQUENCY OF USE OF POU METHODS — INTERVENTION AREA



the intervention areas, knowledge about chlorine tablets was significantly higher among urban households (52 percent vs. 20 percent in rural households), and knowledge of liquid chlorine was significantly higher among rural households (60 percent vs. 15 percent in urban households). And again, this difference cannot be attributed to any variation in the urban/rural interventions themselves.

An unexpected result was the low level of knowledge about any link between water quality and diarrhea. In both intervention and comparison areas, only 20 percent of households recognized this connection, even when prompted.

Among households in the intervention area, 51 percent mentioned they had heard about POU method/s from an NGO, as opposed to only 1 percent in the comparison area.

Doctors were the most common source of information cited by those in the comparison areas (54 percent). About 21 percent of intervention households cited doctors as a source. Doctors represent an important target audience for future outreach and communications. The mass media were also cited as a primary source of information by more than 30 percent of households in both intervention and comparison areas, indicating the importance of these channels.

AFFORDABILITY

Among those currently using disinfection with chlorine products in the intervention districts, 32 percent said that the product they were using was affordable, and 63 percent said they found it to be cheap. Of those who purchased filters, 27.5 percent said they had obtained a loan to purchase it, and about three-quarters of those obtained their loans from an NGO.

VIII. CONCLUSIONS AND LESSONS LEARNED

CONCLUSIONS

The public and private sectors were willing in this project to adopt a new business model together in order to reach those below the poverty line. An engaged commercial sector was able to reach a substantial new market by partnering with NGOs and micro-finance institutions. NGOs have been able to raise awareness about clean drinking water, and also provide a solution to the problem. This has raised their standing in the community, and has also provided jobs for NGO workers as demonstrators and micro-distributors.

The POUZN/AED model is expanding throughout India. Hindustan Unilever has replicated the model in other parts of UP and arranged to use Access Micro-finance in Hyderabad to provide a source of micro-financing for partnership NGOs, and has also adopted the materials for use in Chennai where self-help groups are very common. PATH has opened micro-credit programs on the POUZN model in five additional states with funds from the Bill and Melinda Gates Foundation. Eureka Forbes is also preparing to expand its activities in UP and WaterAid (an international NGO) is considering expanding the project. Other manufacturers as well as donors have expressed interest in the model.

Although the program model was conceived as operating independently of government delivery systems to the poor, POUZN is

sharing the model and lessons learned with federal and state agencies involved in health, urban welfare, and water and sanitation. The potential for involving community outreach workers (such as Anganwadi and ASHA workers) is great. Collaboration with other USAID projects also offers possibilities.

Public-Private Partnerships are a cost-effective development model. The fourth year of funding illustrates the model's cost-effectiveness. In FY 09, POUZN received \$300,000 from USAID. During the same period, POUZN generated \$210,000 worth of leveraging support from its commercial and other partners. PSI and Medentech each committed free POU products worth \$70,000 to Operation *Jal Mitra*. HUL contributed over \$20,000 in cash, in-kind, and management support. PATH's grant of \$50,000 provided insights on the potential for targeted subsidies and installment schemes.

LESSONS LEARNED

The role of a catalyst is essential in building a public-private partnership, but can be reduced over time. Commercial and socially active NGOs speak different languages and move at different paces. Industry is focused on the bottom line and prefers cash rather than credit transactions; NGOs are reluctant to be sellers and distrust the private sector. POUZN was able to build an enthusiastic alliance that served mutual

interests—including those of low-income consumers. The commercial partners are expanding the model at their own expense in new blocks in UP and elsewhere in India. Major donor inputs to this collaboration should not be required over the long term.

Good feedback systems and the openness and agility to adjust strategies are central to the success of a development project. The project's original vision was adjusted in major ways as field realities emerged. This included offering more product options to consumers, shifting from the plan for SHG-based micro-distributors to more direct collaboration and support to NGO staff, and altering the behavior change strategy in rural areas. Refining credit and subsidy strategies was an ongoing process.

A demonstration project for a new business model enhances the potential for learning and “getting it right” at scale. By their nature, smaller projects can be more agile and adjust faster and more cost-effectively to on-the-ground lessons. Start-up can begin without expensive and time-consuming research if target audience perspectives are understood and monitored regularly. A demonstration project offers a smaller element of risk to partners and provides necessary proof of concept to attract additional partners for scale-up.

Women's self-help groups are an effective channel for promoting POU methods and practices. They provide a good entry point for communities because women are typically responsible for drinking water and SHG members tend to be entrepreneurial and socially aware. Groups can provide mutual support for adopting new behaviors. Group members can be an effective channel for conveying information and modeling new behaviors to the wider community.

Self-help groups with access to micro-finance provide a feasible platform for purchase of expensive filter devices. This was demonstrated in the initial project period, particularly in urban areas. During the project period the relatively high price of filters meant that sales would not be successful in the absence of credit.

NGOs can be trained to become effective product demonstrators and micro-distributors. The original model relied on the commercial sector field agents as product demonstrators, but this was not scalable. The project hoped that SHG members could become micro-distributors, but this proved unworkable. Members lacked the skills, motivation, and mobility to sell to the larger community. As an unbiased and trusted source, the NGO workers were able to provide information to SHGs about POU “in their own language” and were effective demonstrators and micro-distributors of products. A *Jal Mitra* contact for each community helped consolidate orders and POUZN made time-limited contributions toward their salaries in order to supplement the low margins they were able to earn on sales. Since field support ended, the NGOs have reduced their sales forces by about half. Nevertheless, both NGOs have created social marketing arms in their organizations, offering a small basket of branded products. This unexpected outcome of the project reflects the confidence these groups feel in the sustainability of their partnerships with the commercial sector.

Urban and rural audiences require different approaches. POUZN found that awareness of water contamination, aspiration for and access to products, availability of credit, and other factors created entirely different barriers for urban and rural audiences. Lack of awareness of water contamination was the chief barrier in rural areas. Providing visual evidence of



Chlorine products were promoted successfully in both urban and rural areas.

contamination (through H₂S test kits) was a cheap, participatory, and effective behavior change tool to address this barrier. In urban areas, weak community bonds limited the growth of self-help groups engaged in micro-finance activities.

Target audiences know what products they prefer. The project ultimately sold more filters in urban areas because families saw the products were owned by their wealthier neighbors and aspired to have filters themselves. (As filters start to appear in rural areas, they may also become status symbols there.) Liquid chlorine was especially popular in rural households, while tablets were preferred in urban areas. The reason for this difference in preference deserves further investigation.

Need for mid-range products. Currently there is a large gap in the product line

(between the least expensive liquid chlorine product costing under Rs10, and multi-stage filters). Towards the end of the project, Tata's *Swach* filter entered the market at half the price (at Rs 999) of those initially offered by HUL and Eureka-Forbes. HUL followed soon after with a similar low priced filter, which is now available through the project NGOs. These new products have interjected competition into the market and prices can be expected to keep falling.

Converting people to using POU devices/methods takes time and family consensus. The project found that multiple sessions were needed to bring about behavior change, and that home visits (where primary decision makers such as husbands and mothers-in-law can be involved) were most successful. A filter purchase required a capital outlay and involvement by the head of the household.

Even the purchase and use of chlorine required endorsement by the decision maker in the household.

Behavior change takes place in stages and requires support. The goal for a POU intervention was first trial of a behavior, then regular use, and finally consistent use. Self-report of behavior may not be an accurate way to determine consistent use. Ultimately, testing water at the point of use is needed to

confirm treatment. POUZN saw a drop-off over time in use of chlorine by users. The project also found that in some homes with multi-stage filters, disinfecting cartridges were lasting much longer than would be expected—indicating low usage. In both urban and rural areas, sustained attention to the importance of clean water at the point of use will be essential to bring about a change in practices over the long term.

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