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BRINGING THE CONSUMER TO THE TABLE:

PERCEPTIONS AND PRACTICE OF HOUSEHOLD WATER TREATMENT METHODS IN NEPAL

RESEARCH BRIEF May 2006

The objective of this Point-of-Use Product Trial is to contribute to the base of formative research available to develop the national Point-of-Use (POU) Marketing Strategy, and a hygiene improvement strategy and implementation workplan for POU water treatment for four selected DACAW (Decentralized Action for Children and Women) districts in Nepal.

These four districts are the focus of the USAID-funded and UNICEF-supported pilot districts, namely Panchthar, Parsa, Kapilvastu and Dang, where hygiene activities have continued since the mid-nineties. This specific formative research component aimed to provide a hands-on consumer perspective of the general concept of water treatment, and explore consumer perception of using four types of water treatment methods over time, to capture perceived benefits and obstacles of use.

The trial methods included those proven efficacious in lab conditions and currently or soon-to-be-available in Nepal – boiling, SODIS (solar disinfection), colloidal silver (CS) filters and chlorination. Twenty mothers in each district were asked to try one method supplied to them free of cost for a period of about one month; five mothers in each district tried one method. Trained qualitative researchers visited mothers in their home approximately 3 and 30 days after the initial visit to assess immediate reactions, and then reactions and continued practice over time.

Each method was evaluated by a group of mothers with small children according to particular characteristics:

- Taste
- Smell
- Appearance
- Temperature
- Acceptability to family members
- Effort, convenience, maintenance
- Perceived effectiveness
- Perceived value

Photo: Julia Rosenbaum, Academy for Educational Development

After trying one method for a minimum of one month, respondents were shown water treatment options and asked to compare "their" method with the others using the characteristics outlined above. A short baseline survey, essentially an abbreviated version of the larger UNICEF baseline survey, was applied in each household at first visit to assess sociodemographic measures, current knowledge, perceptions and practice related to hygiene and sanitation.

A fifth treatment method, the Biosand filter, was considered for the product trial, but eventually was not included for both logistic and security reasons. The size and weight of the filter made transport difficult, and suspicious to mobilize throughout the districts given the precarious security situation in Nepal and the possibility of the components being mistaken for homemade bombs. As a solution, researchers re-visited households from a previous filter promotion project, and talked with

a small sample of current and past Biosand filter users and interviewed them about the likes and dislikes of that treatment method. As in the other study households, Biosand users were shown the other four treatment methods and asked to compare Biosand to those other methods, commenting on the various criteria such as smell, taste, effort, and so on.

KEY FINDINGS

All mothers participating in the study were quite willing and needed little convincing to try the water treatment method assigned to them. This was particularly noteworthy because the general finding is that most households visited do not see their water as unfit for drinking. Other studies have shown that up to 56 percent of tube well water had fecal contamination (Arsenic Testing Study in the Terai, 2003) and the 2001 DHS survey documented hygiene and storage practices that guaranteed further contamination of water at the household level. Actual contamination at point of first contact was assessed, and many but not all water samples collected prior to method use were contaminated.

Households were overall successful in using the various techniques to treat water. On the second visit, most drinking water tested clean, indicating householders success at using the method. This was true for all methods but the CS filter, which actually showed a slight increase in contamination rates. It is assumed but not proven that water still testing positive for coliform and e-coli after treatment was from secondary contamination, although researchers have no evidence that water was ever effectively treated.

Respondents across all districts noted the following characteristics of water that was "good and fit to drink:"

- Clear
- Free of turbidity, visible dirt and/or sand and to a lesser extent
- Free of bugs and insects
- Absent of (objectionable) smell
- Cool water was also a highly desired attribute, though not necessarily tied to water that was "fit" to drink.

Virtually no one expressed any sense of "microbial" or bacterial contamination (not the words per se, rather the concept of matter in the water that might cause illness) when considering the need to treat water. Likewise, few attributed diseases in general or diarrhea in particular to unfit water; rather most attributed diarrhea to "stale" food. While some significant number responded that drinking clean water could help to avoid diarrhea, this was not a predominant concept for most participants.

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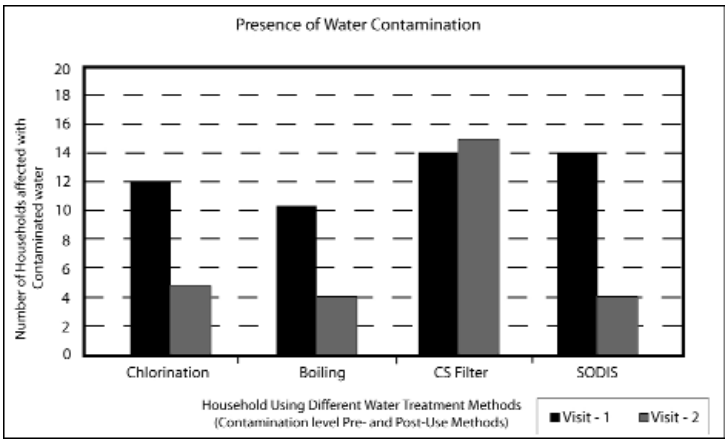
The respondents were not able to comment and give their opinion on the attributes of drinking water easily especially concerning the water's appearance and texture. The researchers had to probe with specific words and note respondent opinions after respondents were given descriptions such as slippery and oily texture.

Photo: UNICEF/Nepal

After baseline measure, when researchers explained that the method left with them (and on the final visit when all methods were explained) would remove bacteria and invisible, disease-causing matter in the water, participants appeared to grasp this concept of 'contamination', and valued the benefit of making the water "healthier" for their family. They repeated this benefit throughout the interviews, both at second and third visits.



Demonstration prior to assigning the method was enough to learn to use the assigned method adequately, and for the most part, proper use was maintained over the one-month study period. Most respondents anticipated on first visit that they would be able to use the method easily, and this opinion persisted over the month-long trial. During the one month observation period, respondents made few adaptations or modifications of the treatment methods despite the study design, which invited problem-solving and method adjustment to increase desirability and ease of method use. This lack of barriers to use, perceived difficulties, or dislikes of methods was actually a surprising finding, as researchers had anticipated greater resistance to incorporating a routine of treating water. The few modifications made or observed are outlined in the last section of the summary.

Without considering the cost of purchase or use, the most popular method across all districts was the CS filter for its ease of use, followed by chlorinating water. The other two methods, SODIS and to a lesser extent boiling were satisfactory to consumers. Serious concerns arose, however, about the efficacy of the CS filter based on the level of contaminated water after treatment with the CS filter. Questions remain about the efficacy of the CS filter and it will be important to determine whether problems are with the filter systems themselves or with secondary contamination associated with improper filter maintenance.

Most common dislikes of the methods included the warm temperature rendered by boiling, SODIS, and to a much lesser degree, perceived to be from chlorination. Some respondents found the smell of chlorination to be problematic, although no one discontinued use because of the smell. Interestingly, smell rather than taste of chlorination was more commonly mentioned as disagreeable. Smell was mentioned to a lesser extent with other methods. Other barriers included the receptacle size, or rather the limited amount of water that could be disinfected at one time, and the time needed to disinfect another "batch." This was true for all methods except for SODIS, where households were given an adequate number of bottles to disinfect the household's water supply. The portability of the SODIS bottles was a perceived benefit of this treatment method.

[1] In Panchthar, researchers were unable to return to most homes within 30 days due to the security situation. As a result, chlorine users had run out of their 30-day supply and therefore technically "discontinued" use, though for no reason other than lack of supply and unavailability of product in the commercial market.

While participants had little previous practice storing water and particularly storing water or "letting it sit" overnight, little resistance was encountered in storing SODIS or the CS filter treated water.

All respondents said that they had shared their one-month method use experience with their neighbors and were overall quite positive about the new water treatment methods introduced to them.
Discontinuation of treatment method was almost exclusively attributable to method malfunction or running out of supply. Method malfunction was observed more in the cases of SODIS (weather conditions) and the CS filter (broken filter candle or candle nut).

While most study participants continued their method use over the entire trial period[1], anecdotal evidence suggests that they did not exclusively consume disinfected water over the study period, rather supplemented the treated water with their 'regular' water. Certainly, with the exception of solar disinfected water, which is disinfected in its own portable container, no participants carried treated water to drink outside the home.

Researchers noted a lack of a second vessel for treating and storing water as an obstacle to easy treatment with all methods other than the CS filter. Lack of furniture or objects to lift the CS filter from the ground to access the tap was an initial obstacle that was easily resolved by householders (often with researcher assistance) by raising the filter on a platform of bricks or similar material.

Other findings:

- Respondents perceived SODIS (solar disinfection) as a relatively easy water disinfection method, but did not particularly "like" it as it depended on sun, and couldn't be used in all weather conditions. Many reported general lack of availability of bottles that could present a barrier to method use. The research team also reported unavailability of bottles at study locations. Even among the respondents, using bottles for drinking water was not a common practice. Many respondents using SODIS were eager to try a different water treatment method, preferably a method that could be used throughout the year and not be dependent on sunshine. No respondent expressed any reservations about drinking water that had stayed overnight, or of the perceived effectiveness of "solar" disinfection even on a cloudy day.

Using bottles for drinking water was not a common practice. Many reported general lack of availability of bottles—a potential barrier to method use.

- Respondents liked the ease and convenience of the CS filter, and their reported commitment to continued filter use was high. The CS filter was the method most preferred among all the others across a range of attributes. It was also the least preferred with reference to the filter's affordability. During the study period, however, participants found the filters themselves to be delicate and a number experienced problems with the candles. All households that stopped using the CS filters had done so because their filters no longer functioned. Problems included "shedding" clay from chips in the candles, color "bleeding" into the upper filtration bucket, leaking taps, and broken connector screw knob or candle. Field workers observed inconsistent quality and flow rate of candles. Lastly, water from three-fourths of all filters tested positive for contamination. All filters were confirmed functional before being given to respondents, so we can assume high rates were due to either fatal damage occurring somewhere after testing or secondary contamination due to some unidentified reason. These product issues are of concern, and must be resolved before this method can be widely promoted.

- Most mothers using chlorination accepted the method well. They reported the method to be easy to use. However, most respondents reported the smell of the disinfected water to be not good.

- Most respondents said they are willing and able to pay for the method at its market price. Across the range of water attributes, chlorination was the second most preferred treatment method after the CS filter. However the respondents were more comfortable with the price of chlorination to that of the CS filter.

- Most respondents reported boiling to be an easy process to disinfect water. It was, however, the least preferred water treatment method. Boiled water was said to be warm and not pleasant to consume, particularly during the hot summer months. It was found to be unappealing to family members. The respondents did not comment on the reduced time required for boiling water in this "new" recommended boiling technique, which instructed that water was disinfected at the sight of the first big bubble. This is most probably attributable to the fact the householders adhered to the previous recommendation of bringing water to a hard boil for 3-10 minutes.

Among the BioSand filter current and past users the flow rate seemed to be a concern for all; and all were well aware of the filter's benefits, but the effort and the patience needed to collect water was cited as the major reasons as to why some of them discontinued use.

CONSIDERATIONS AND DISCUSSION

Incorporating consumer perception and practice into household water treatment strategies is vital to creating effective and sustainable programs.

The practice of water treatment is a complex behavior. Products and supplies must be available, householders must believe that drinking water may have negative health effects and they must be motivated and possess the skills to practice the treatment consistently and correctly.

Water treatment practice can be broken into the following sub-behaviors:

- Obtain water
- Separate drinking (and cooking) water
- Place/store in a clean vessel

Photo: Voiles Sans Frontières Suisse

- Choose a method/obtain that method
- Treat correctly
- Protect (cover, store and use water without recontaminating)
- Drink this water always at home (at work, and in school)

Households must be able to perform each behavior consistently and correctly to realize individual and public health impact. As highlighted in the research findings, each sub-behavior carries its own set of barriers and challenges that must be few enough to assure the entire set of behaviors are practiced. The Nepal Household Water Treatment Marketing Strategy being informed by this research must address the following barriers to promote water treatment uptake at scale.

Any strategy must first address perception of risk as part of a behavior change strategy. Since respondents voiced little concern about any microbial or bacterial contamination, a marketing strategy would have to heighten household awareness that cool, clear water can still cause diarrhea.

The uptake of household water treatment will depend upon methods meeting household perceptions of water that is considered fit to drink. Any treatment product must be able to produce water that people consider fit

Photo: UNICEF/Nepal

to drink. Findings from this study revealed that any treated water will have to be clear, not turbid, and not have an offensive odor. Cool water was also highly valued.

Drinking and cooking water are not currently separated from other household water. A household water treatment marketing or promotion strategy will need to focus on increasing the availability of additional water storage containers to convince consumers to separate drinking and cooking water from other water. Increased access to plastic PET bottles may be required so consumers will use solar disinfection. If drinking and cooking water are not separated, households would need to treat up to 150 liters of water a day, about 10 times the amount used for drinking. This signifies 10 times the cost and 10 times the effort, creating a tremendous barrier to treating water.

The lack of an additional vessel creates a number of critical challenges, and invites the question of which recommendation is appropriate for the marketing strategy:

- treat all water, requiring exponential time and/or product to treat water also used for cleaning, washing and cooking;
- separate and treat water used just for drinking (and cooking), requiring that drinking water is separated from other waters, when currently a separate or spare container for drinking water may not be readily available;
- treat drinking water consumed in the home with separate containers as above, but also have an articulated strategy for drinking treated water outside of the household compound (in the fields, at school, etc.)

Help entire household drink treated water all the time. It became quite clear that while most households were actively engaging in water treatment when prompted, few treated water all the time. This was related to a number of factors, including lack of an extra water storage container in the household to treat enough water for continuous use; and lack of a portable vessel to carry when outside the home. Also related was a perceived lack of time to treat enough water for household use (see discussion below on receptacle size).

It is unclear whether householders felt the **need** to consume disinfected water all the time, which relates to a lack of perception of poor water quality. While children and elders were named as benefiting most from good water, differential consumption by age or gender was not observed.

Addressing issues of access: Because participants had little overall resistance to treating water (though few saw a need for it other than simple cloth filtration to reduce turbidity), household water treatment promotion should seek to assure working products that are available and affordable. This means

- assuring the **efficacy** of all methods (particularly the CS filter) and
- assuring **easy access** of product through dispersed distribution systems and schemes that assure price is not an insurmountable barrier to use. This refers in particular to the CS filter that, for the average Nepali family, requires a sizable initial outlay of cash. Finance and credit schemes have been used successfully to allow for installment payments on filters. No method aside from boiling is currently available in rural Nepal,

although promoters of both hypochlorite products assure stepped up distribution in project intervention areas. In other settings, the cost of chlorination has been carefully studied to so poor and rural people can purchase it. The private sector in other counties has assisted with distributing empty PET bottles in rural areas for solar disinfection.

Changing product to meet consumer need: Study participants commented on the slow flow rate of filters and the small size of the filter storage unit and the boiling kettle. Thus, to ensure sustained uptake of these treatment methods, products may need to be redesigned to meet these consumer needs.

Some anticipated barriers, most notably a prohibition on drinking water stored overnight, were not mentioned by householders as disadvantages of certain water treatment methods, most notably SODIS and possibly the filters.

The importance of an interpersonal communication component. Most respondents accurately described to researchers the steps involved in each method, both at 3 and 30 days. Most reported talking to family and neighbors about their method. This implies that treatment is conceptually easy to grasp, and that respondents retained detailed explanations even over a one month period. One can speculate that the intensive interpersonal component of the research helped to anchor somewhat detailed instructions in the minds of householders, and therefore any demand creation and promotion should include an interpersonal component.

CONCLUSION

Understanding the consumer or household viewpoint is critical to the uptake of household water treatment and storage methods. To reduce diarrheal disease from water contamination and to achieve household and public health impact, water treatment methods must be efficacious in inactivating pathogens that cause diarrhea. But they must also be feasible and affordable to householders, and practiced consistently and correctly. Research findings such as these provide critical input to developing a water treatment marketing strategy, as is being done currently in Nepal.

Full research findings, study instruments, and the Nepal Marketing Strategy can be found on the HIP website www.hip.watsan.net.

The author's views expressed in this publication do not necessarily reflect the view of the United States Agency for International Development or the United States Government.

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