
**Issue 41 February 3, 2012 | Year in Review, Household Water Treatment & Safe Storage (HWTS)**

This *WASHplus Weekly* contains 10 household water treatment and safe storage studies published in 2011. A number of HWTS technologies are reviewed, including studies on the technical performance of slow sand filtration, Moringa seeds, and Biosand filters. Studies from Bolivia, Malawi, and Rwanda investigate the behavioral and cultural aspects that influence the adoption and use of HWTS by communities. In addition to the 10 studies, links to two previous *Weekly* issues on HWTS and a listing of HWTS-related websites are included. Please let WASHplus know if you have other resources on this topic or if you have suggestions of topics for future issues of the *Weekly*.

**ARTICLES, REPORTS**

- **Access to Safe Water: Approaches for Nanotechnology Benefits to Reach the Bottom of the Pyramid,** 2011. DFID. Full-text
  This study explores how the emerging field of nanotechnology can help tackle some intractable issues related to poverty and move research from the lab to the bottom of the pyramid (BoP). While nanotechnology shows promise in finding innovative ways to treat drinking water, a number of barriers impede widespread roll out and adoption of these solutions. The study found that nanotechnology research can reach the BoP through innovative and appropriate delivery models.

- **Bacterial, Viral and Turbidity Removal by Intermittent Slow Sand Filtration (ISSF) for Household Use in Developing Countries: Experimental Investigation and Modeling**, *Water Res, Nov 2011*. M Jenkins, University of California. (Abstract)
  This is the first study in which simultaneous measurement of bacteria, viruses, and turbidity removal at the batch level over an extended duration has been undertaken with a large number of replicate units to permit rigorous modeling of ISSF performance variability within and across a range of likely filter designs and operating conditions. Results point to new recommendations regarding filter design, manufacture, and operation for implementing ISSFs in local settings in developing countries. Sand size

emerged as a critical design factor in performance.

- **A Community-based Approach to Promote Household Water Treatment in Rwanda**, *Journal of Water and Health, Jan 2012*. S Chankova, Abt Associates. (Abstract)
  A pilot project in two districts in Rwanda aimed to increase use of Sûr'Eau, a chlorine solution for drinking water treatment, through a partnership between community-based health insurance schemes and community health workers who promoted and distributed the product. Evaluation of the pilot, drawing on a difference-in-differences design and data from pre- and post-pilot household surveys of 4,780 households, showed that after 18 months of pilot implementation, knowledge and use of the product increased significantly in two pilot districts, but remained unchanged in a control district. The findings suggest that exposure to interpersonal communication on Sûr'Eau and hearing about the product at community meetings and health centers were associated with an increase in use.

- **Factors Associated with Compliance among Users of Solar Water Disinfection in Rural Bolivia**, *BMC Public Health, Apr 2011*. A Christen, Swiss Tropical and Public Health Institute. (Full-text)
  This study investigated the behaviors associated with SODIS adoption among households assigned to receive SODIS promotion during a cluster-randomized trial in rural Bolivia. Most of the observed household characteristics showed limited potential to predict compliance with a comprehensive, year-long SODIS-promotion campaign; this finding reflects the complexity of behavior change in the context of household water treatment. However, findings also suggested that the motivation to adopt new water treatment habits and to acquire new knowledge about drinking water treatment is associated with prior engagements in sanitary hygiene and with the experience of contemporary family health concerns.

- **Removal of Escherichia Coli and Faecal Coliforms from Surface Water and Groundwater by Household Water Treatment Devices/Systems: A Sustainable Solution for Improving Water Quality in Rural Communities of the Southern African Development Community Region,** *Int J Environ Res Public Health 9(1) 2012. J Mwabi,* Tshwane University of Technology. Full-text
  The purpose of this study was to examine five filters—Biosand filter-standard, Biosand filter-zeolite, bucket filter, ceramic candle filter, and silver-impregnated porous pot (SIPP)—and evaluate their ability to improve the quality of drinking water at the household level. The findings of this study indicate that the SIPP can be an effective and sustainable HWTS for Southern African Development Community rural communities, as it removed the total concentration of bacteria from test water, can be manufactured using locally available materials, and is easy to operate and maintain.

- **Risk Management in a Developing Country Context: Improving Decisions**

**About Point-of-Use (POU) Water Treatment Among the Rural Poor in Africa**, *Risk Analysis, Aug 2011*. J Arvai, University of Calgary. (Full-text)
This study focused on the development of a deliberative risk management framework for involving affected stakeholders in decisions about point-of-use water treatment systems. This research, which was grounded in previous studies of structured decision making, took place in two rural villages in the East African nation of Tanzania.

- **Storing Drinking-water in Copper-pots Kills Contaminating Diarrhoeagenic Bacteria**, *Jnl Health Pop Nutr, Dec 2011.* V Sudha, Institute of Ayurveda and Integrative Medicine. Full-text
  This is the first report on the effect of copper on S. flexneri 2a, enteropathogenic E. coli and Salmonella Paratyphi. After 16 hours, a slight increase in the pH of water was recorded from 7.83 to 7.93 in the copper pots while the other physicochemical parameters remained unchanged. Copper content (177±16 ppb) in water stored in copper pots was well within the permissible limits of the World Health Organization. Copper holds promise as a point-of-use solution for microbial purification of drinking water, especially in developing countries.

- **Understanding Why Women Adopt and Sustain Home Water Treatment: Insights from Qualitative Research in Malawi**, 2011. J Foster PATH. (Full-text)
  This fact sheet discusses a program that distributed free hygiene kits, including samples of WaterGuard, to 15,000 pregnant women attending 15 antenatal clinics. One finding was that interpersonal communication with community health workers and other social supporters, such as husbands, encouraged continued use of WaterGuard. Also, the incentive of offering a free product to pregnant women over an extended period of time encouraged use and helped people get used to the product.

- **The Use of Moringa Seed Extract in Water Purification**, 2011. D Yahaya, Federal University of Technology. (Full-text)
  This research was carried out to confirm the effectiveness of powder extracted from mature-dried Moringa oleifera seeds, which are commonly available in most rural communities of Africa. Comparative studies with potash alum showed that the seed was effective in the sedimentation of inorganic and organic matter in raw water. It reduced the total microbial and coliform counts by 55 percent and 65 percent, respectively, after 24 hours, whereas potash alum achieved 65 percent and 85 percent reductions under similar conditions. Findings of this research lend support to earlier works recommending the use of Moringa for water treatment.

- **What Point-of-Use Water Treatment Products Do Consumers Use? Evidence from a Randomized Controlled Trial among the Urban Poor in Bangladesh,** *PLoS One, 6(10) 2011.* J Luoto, RAND Corporation. Full-text
  Evidence suggests that household point-of-use water treatment products can reduce the enormous burden of water-borne illness. Nevertheless, adoption among the global

poor is very low, and little evidence exists on why. This study provided free trials, repeated informational messages explaining the dangers of untreated water, and a variety of product designs. The low usage of all products despite such efforts makes clear that important barriers exist beyond cost, information, and variation among these four product designs.

## PREVIOUS HWTS WASHPLUS WEEKLIES

- July 7, 2011 - (Link)
- April 15, 2011 - (Link)

## WEBSITES

- USAID WASHplus Household Drinking Water Quality newsfeed – (Link)
- USAID HWTS fact sheets, manuals - (Link)
- USAID WaterSHED Asia- (Link)
- CDC SafeWater System - (Link)
- Centre for Affordable Water & Sanitation Technology (CAWST) - (Link)
- IDE – Ceramic Water Purifier - (Link)
- Massachusetts Institute of Technology/Water and Sanitation - (Link)
- PATH Safe Water Project - (Link)
- SODIS – Solar Water Disinfection - (Link)
- WHO Network to Promote Household Water Treatment & Safe Storage - (Link)

Each *WASHplus Weekly* highlights topics such as Urban WASH, Indoor Air Pollution, Innovation, Household Water Treatment and Storage, Hand Washing, Integration, and more. If you would like to feature your organization's materials in upcoming issues, please send them to Dan Campbell, WASHplus knowledge resources specialist, at dacampbell@fhi360.org.

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**About WASHplus** - WASHplus, a five-year project funded through USAID's Bureau for Global Health, creates supportive environments for healthy households and communities by delivering high-impact interventions in water, sanitation, hygiene (WASH) and indoor air pollution (IAP). WASHplus uses proven, at-scale interventions to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under five years of age globally. For information, visit **www.washplus.org** or email: **contact@washplus.org**.