

REACH

Ending Child Hunger and Undernutrition

Acting at Scale: Intervention Guide

Household Water Treatment

August 2008

Context

The following document is part of the REACH *Acting at Scale* set of materials

- The documents' aim is to provide highly condensed information and lessons learned for scaling up REACH-promoted interventions to support field practitioners and other interested parties
- They are intended to become a living set of materials, updated periodically by the REACH Global Interagency Team
- These materials are a first step towards a larger REACH Knowledge Sharing service, which will be developed over time

The full set of *Acting at Scale* materials includes

- *An Intervention Summary*
 - An overview document containing key facts for all of the 11 promoted interventions
- *Intervention Guides* for each of the interventions¹
 - Containing rationale, lessons learned, costs and further resource lists
- *Implementation Case Studies* for each of the interventions¹
 - Initial set of details and lessons learned from programs implemented at scale
- *Resource Lists*
 - Lists of key documents, organizations and programs at scale
 - Included at the back of each *Intervention Guide* and in Excel spreadsheets available from the REACH Global Interagency Team

These materials represent a preliminary version, to be validated and refined via additional consultations

- Prepared in Summer 2008 by the REACH Global Interagency Team, based on inputs from 56 practitioners and experts, as well as extensive desk research
- A revised Version 2 of these documents will be released in late 2008 or early 2009, incorporating feedback from initial recipients

If you have questions or feedback on these materials, please

- Contact your local REACH facilitator in Lao or Mauritania, or
- Contact the REACH Interagency Team Coordinator, Denise Costa-Coitinho, at Denise.CostaCoitinho@wfp.org

1. Breastfeeding and complementary feeding have been combined into a single document due to strong linkage in delivery

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Key messages

Household water treatment (HWT) provides safe access to drinking water and effectively avoids diarrhea

- 1.1B people lack any access to drinking water; an additional 3.8 people lack consistent access to safe drinking water
- The resultant diarrhea causes 35% of child deaths in the developing world and contributes to undernutrition by causing the loss of nutrients through stool loss and vomiting
- HWT enables safe, clean water at the point-of-use by removing contamination during distribution, collection and storage
- HWT can reduce diarrhea incidence by ~39%

A number of low-cost, effective HWT technologies are available for household use

- Boiling, solar disinfection, chlorination and ceramic filtration are most widely used
 - Technologies are of roughly similar impact, with slight differences in terms of availability/practicality, technical ease, microbial efficacy and affordability
- Selecting the appropriate technology depends on local norms, conditions and preferences

HWT often benefits from private sector engagement, given the similarities to consumer goods

- HWT delivery channels include UN facilities, NGOs, community, public health systems, as well as private sector retail
 - All can include various private sector roles, from production distribution, to retail sales to higher-income beneficiaries
 - Blend of private/public sector approaches enables public investment to focus on lowest income populations
- Public sector/donor can foster private sector investment by co-investing in consumer research, distribution and marketing
- Requires rigorous selection of the local production partners and ongoing quality control
- Enables more effective social marketing via mass media and private sector

HWT are most successful when beneficiaries' needs and preferences are taken into account

- Formative research and target group segmentation is key to selecting distribution and marketing channels
- Enabling the beneficiaries to choose among HWT technologies increases likelihood of adoption and sustained usage
- Safe storage containers should be included in each HWT program to avoid recontamination of the water after treatment

Education is critical to ensure consistent, proper usage and maintenance of HWT technologies

- Communication channels should be selected based on existing access to beneficiaries, costs and potential impact
- Participatory methods at the community level help to demonstrate the need for and impact of HWT

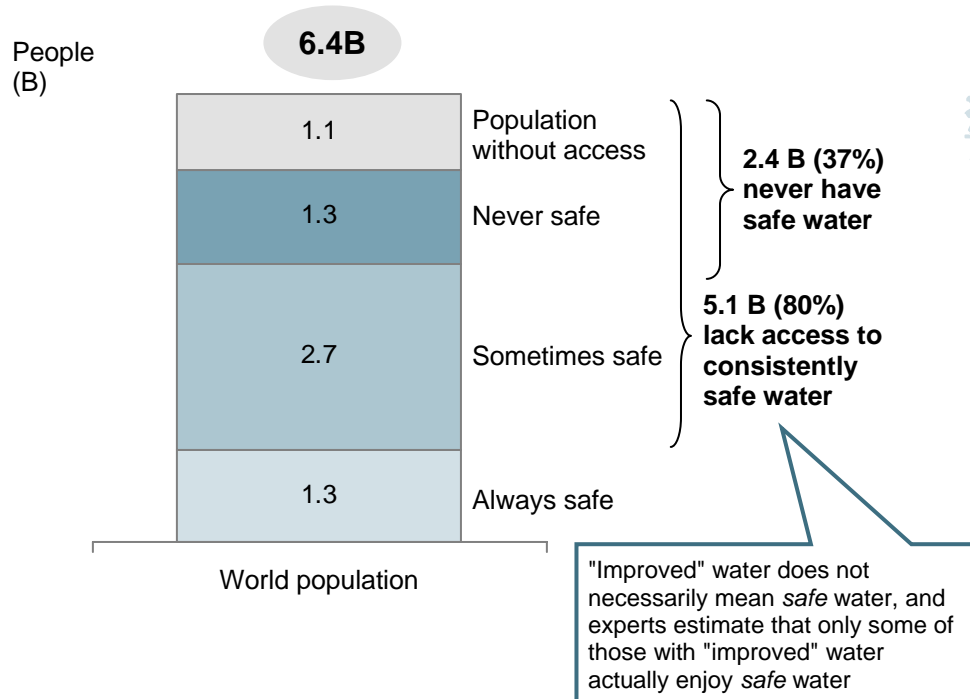
Source: Fewtrell, et al, *Water, Sanitation and Hygiene Interventions to Reduce diarrhea in Less Developed Countries: a Systematic Review and Meta-analysis*, The Lancet, January 2005; "Cost-effectiveness analysis of water quality interventions for preventing diarrhoeal disease in developing countries." Clasen et. al., 2007.; "Household Water Treatment and Safe Storage Options in Developing Countries: A Review of Current Implementation Practices." Lantagne et. al; REACH analysis

Why implement

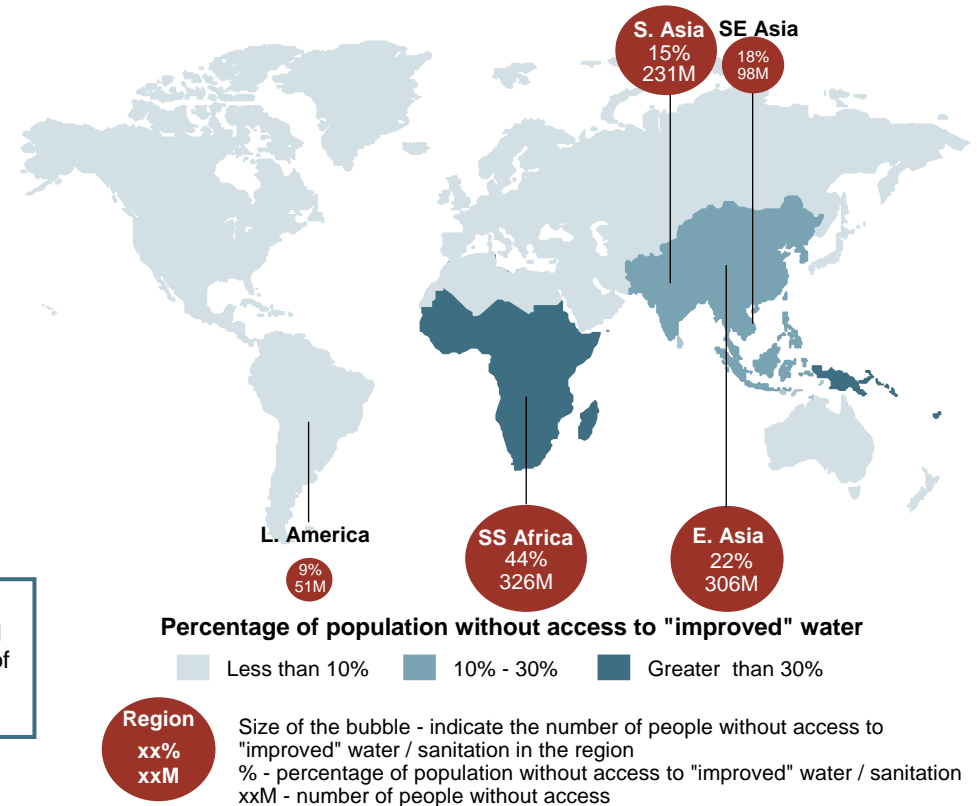
80% of the world lack consistent access to safe drinking water

Greatest gaps lie in Sub-Saharan Africa and Asia

Global access to "improved" drinking water (2004)



African populations face highest proportion of access gaps, while Asian populations without access are larger

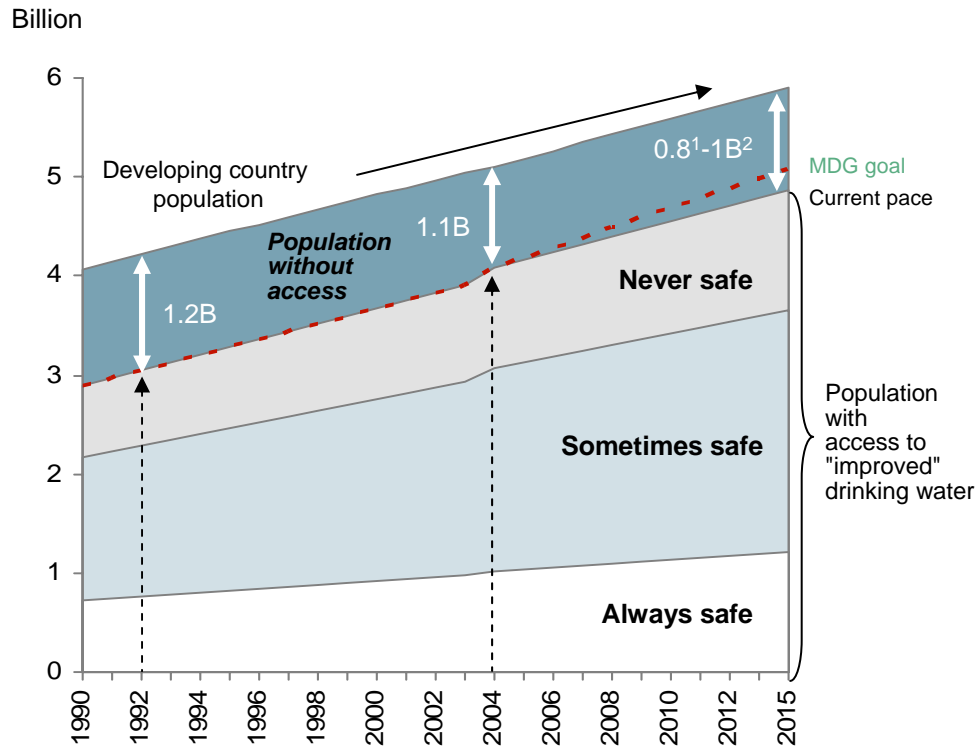


Note: Based on donor-funded household surveys. "Improved" water and sanitation as defined by the WHO JMP database and, not necessarily equal to "safe." (See Appendix I, Slide 5)
 Source: WHO, Meeting the MDG Drinking Water and Sanitation Target, 2006; WHO/UNICEF Joint Monitoring Programme (JMP) data query; IRC Landscaping; Scott, B., V. Curtis, and T. Rabie, Protecting Children from Diarrhea and Acute Respiratory Infections: The Role of Hand Washing Promotion in Water and Sanitation Programs, Regional Health Forum WHO South-East Asia Region 7: 42-47, 2003, based on studies conducted in 8 developing countries including Brazil, Burkina Faso, India, Ghana, Peru, Nigeria, Senegal, Kyrgyzstan

At current pace, MDG safe water target unlikely to be met

But reaching MDG target won't necessarily address the full extent of the problem

Steady – though insufficient – increase in access to "improved" drinking water



But the MDG target doesn't necessarily capture water safety

MDG 7, target 10 aims to halve the proportion of people without sustainable access to safe drinking water by 2015

- But this measures access to "improved water supplies" such as protected wells and springs, boreholes and household connections
- Does NOT consider water quality / safety

"Improved" water does not mean SAFE water

- A study in six countries⁴ found that 31% of drinking water from "improved water supplies" exceeded WHO and national standards for fecal contaminations
- Water is subject to frequent and extensive contamination during collection, distribution, and storage

HWT can ensure water safety at the point of consumption

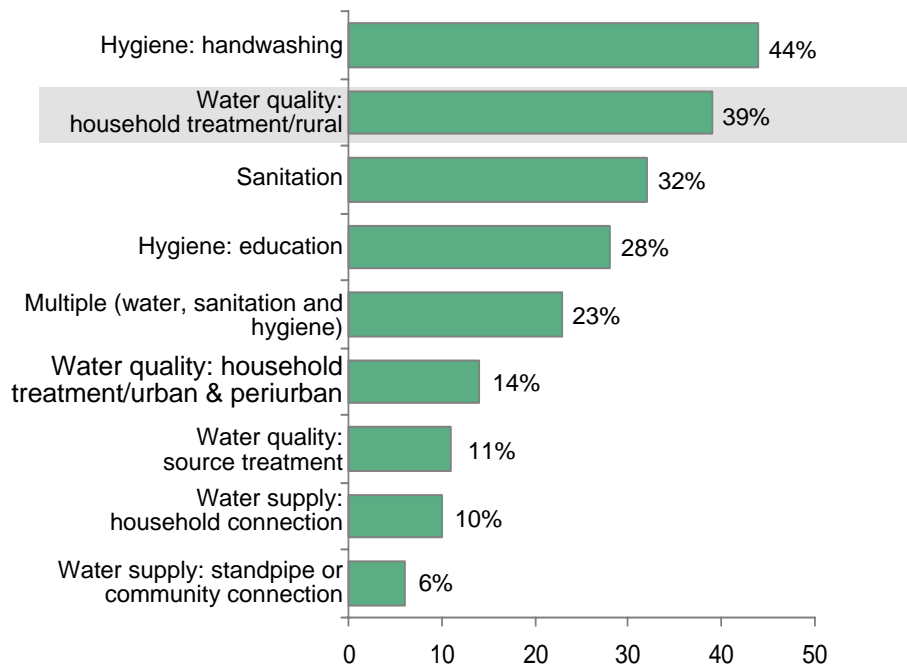
- Various technologies can be applied
- Beneficiaries are put in charge for their own water quality after receiving training and education

1. Projected gap in 2015 if MDG goal is reached in 2015. 2. Projected gap in 2015 if current pace of change continues. 3. Despite access to "improved" sanitation, groundwater contamination may be exacerbated by limited wastewater treatment in developing world 4. "Rapid Assessment of Drinking Water Quality, Summary Report." World Health Organization/UNICEF, 2007.; Note: The MDGs call for halving the water and sanitation access problem (not solving the problem). Two scenarios: 1) MDG targets reached by 2015; and 2) Continuing at current pace towards MDG targets. MDG targets are 89% access to drinking water and 75% access to sanitation by 2015. Data based on donor-funded household surveys. "Developing country" as defined by WHO/UNICEF JMP Source: WHO, Meeting the MDG Drinking Water and Sanitation Target, 2006; WHO/UNICEF JMP data query; IRC Landscaping

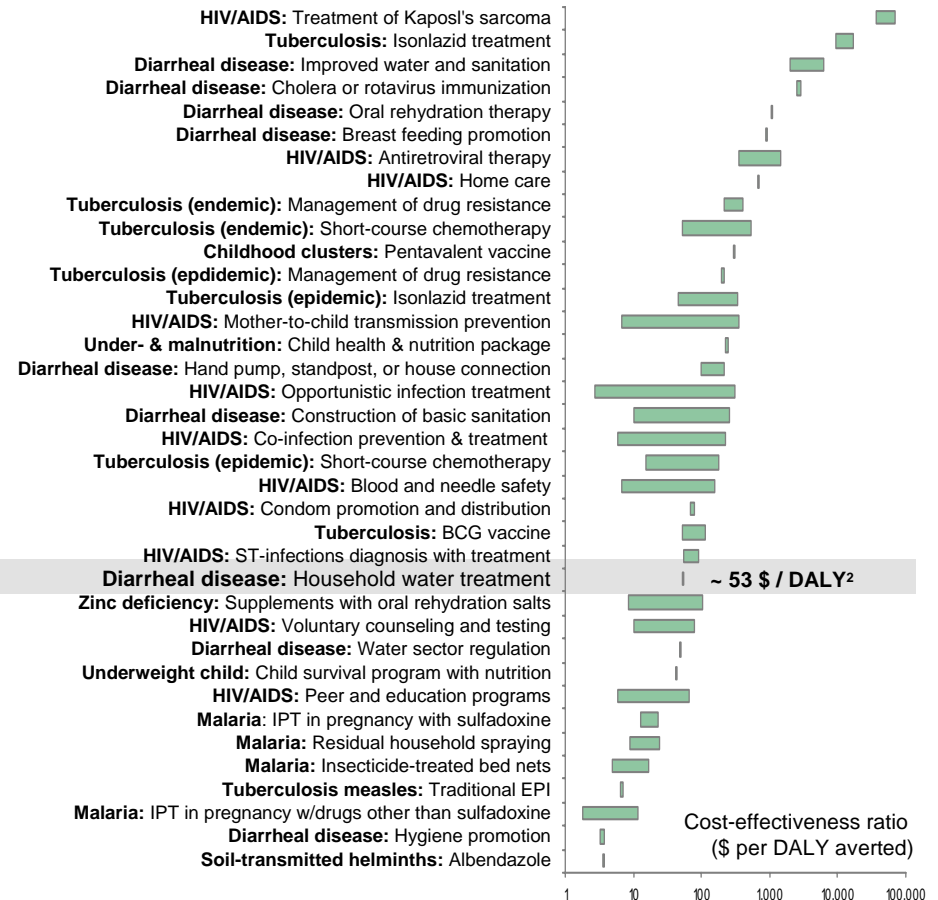
HWT is a highly cost-effective tool against diarrhea

HWT is the second most effective intervention in reducing diarrhea...

Median reduction in frequency of diarrhea¹ (%)



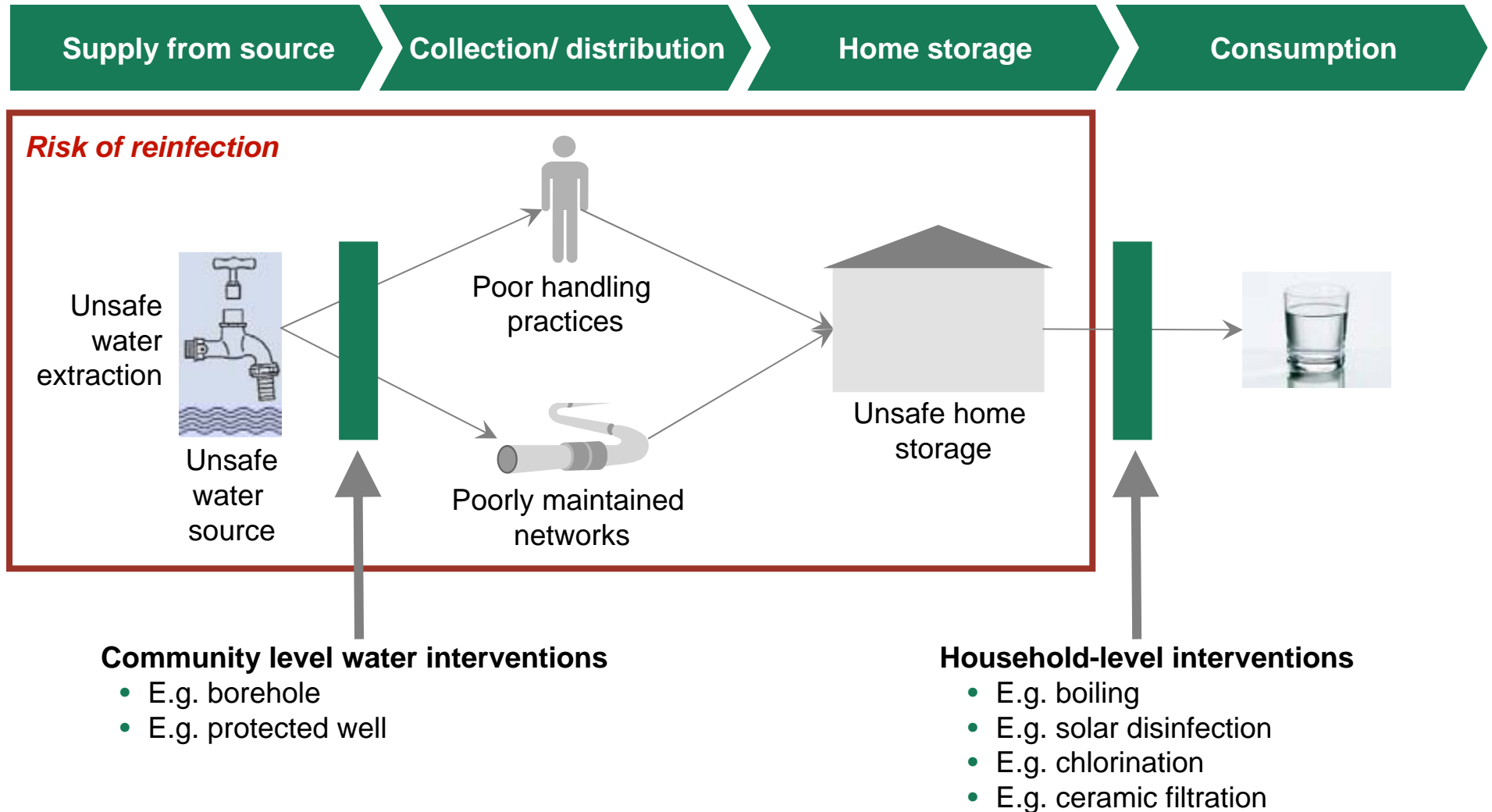
...and is also very cost-effective



1. Meta-analysis based on observational studies 2. "Promotion of HWT and safe storage in UNICEF WASH programmes" UNICEF, 2008.

Source: Fewtrell, et al, *Water, Sanitation and Hygiene Interventions to Reduce diarrhea in Less Developed Countries: a Systematic Review and Meta-analysis*, The Lancet, January 2005; Barreto, et al; *Effect of City-wide Sanitation Programme on Reduction in Rate of Childhood diarrhea in Northeast Brazil: Assessment by Two Cohort Studies*, The Lancet, November 2007; Laxminarayan, et al. *Intervention Cost Effectiveness: Overview of Main Messages*. Disease Control Priorities in Developing Countries, 2nd edition, Chapter 2, 2006.

HWT addresses contamination that arises during distribution, collection, and storage



Four main HWT technologies

Chlorination

Disinfection through sodium hypochlorite solution or chlorine tablets

- Packaged in a bottle
- Caps serve as measuring spoons to add solution to water in a standard container
- Mother agitates container
- Water is ready to drink 30 minutes later
- Requires just enough chlorine to destroy all pathogens but not so much that taste is affected

Ceramic filtration

Disinfection using porous ceramic filters

- Water is poured into filter which usually has a form of vessel or a hollow cylindrical candle
- Water passes through the filters from the exterior of the candle to the inside
- Filters are composed of media capable of adsorbing viruses and are often impregnated with silver which acts as a bacteriostatic agent
- Regular cleaning to remove accumulated material and restore normal flow rate is required

Boiling

Disinfection through heat generated from burning fuels or wood

- WHO recommends to bring water to a rolling boil for 1 minute
 - mainly intended as a visual indication that a high temperature has been achieved
- Even heating to pasteurization temperatures (60° C) for a few minutes will kill most pathogens
- Can be employed regardless of the turbidity or dissolved constituents of water

Solar disinfection

















Disinfection through thermal and UV radiation, e.g. "Sodis" system¹

- Low turbidity water is placed in clear plastic bottles (2L PET)
- Bottles are aerated to increase oxygenation
- Bottles are exposed to sun, e.g. placing on roof
- Exposure time varies from 6-48 hours depending on sunlight intensity
- Sufficient number of bottles needed to allow them to cool and maintain treated water in the bottles until usage

1. Developed by the Swiss Federal Institute for Environmental Science and Technology
Source: "Promotion of HWT and safe storage in UNICEF WASH programmes" UNICEF, 2008.

Each HWT technology has different advantages

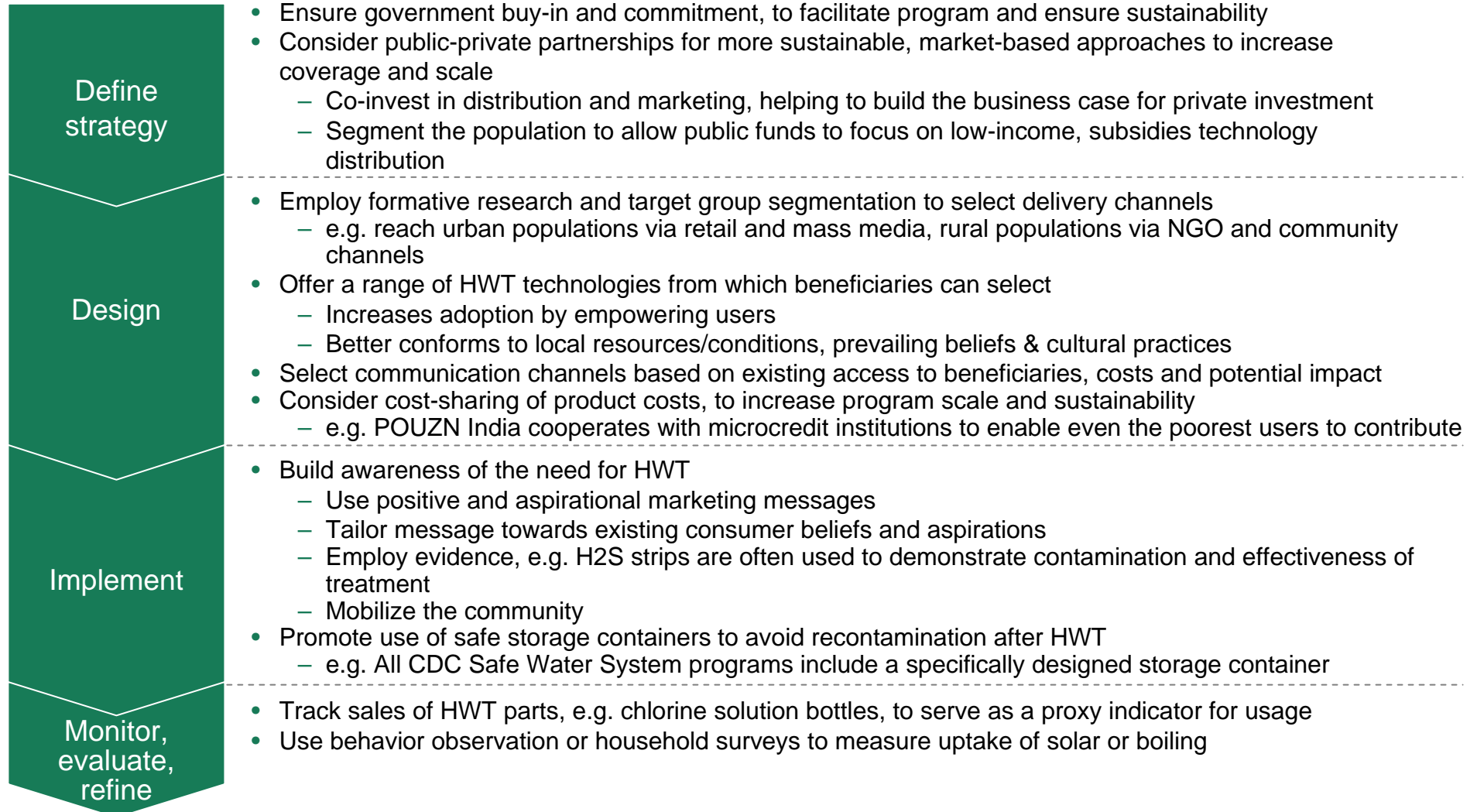
But largely similar impact means that users can select best option for their own needs

	Availability and practicality	Technical ease	Microbial efficacy	Affordability	Other advantages/disadvantages
Boiling	 Depending on fuel availability			 Depending on fuel price	<ul style="list-style-type: none"> • Aggravation of indoor air quality • Risk of respiratory infections • Risk of burning • Low environmental sustainability
Solar disinfection					<ul style="list-style-type: none"> • Low quantities of water disinfected
Chlorination					<ul style="list-style-type: none"> • Dosage has to be made carefully • Affects odor and taste of water
Ceramic filtration					<ul style="list-style-type: none"> • Operates under various conditions (temperature, pH, turbidity) • Introduces no chemicals in water that affect taste and odor • Improves water aesthetically

The decision which HWT system is chosen must not only include "technical" criteria but also local cultural beliefs

How to implement at scale

Key lessons learned about implementing HWT programs at scale



Government buy-in and commitment are critical for HWT programs

Government involvement is essential

- To facilitate registration of any new products
- To identify opportunities to collaborate with other government programs
- To ensure sustainability of programs beyond donor funding

Lessons learned for effective government engagement in HWT

- **Employ evidence-based advocacy to convince government of need for HWT**
 - Governments are overly focused on MDGs, but HWT is currently not considered an "improved water source" within MDG target 10
- **Involve all ministries early on in the process**
 - Multiple ministries (MoH, Mol, ministry responsible for water supply) and other agencies (e.g., bureau of standards) must approve the technology
- **Keep ministries informed on implementation progress and successes**
- **Immediately respond to government concerns**
 - e.g., PSI in Kenya averted the recall of their chlorination product through immediate and accurate communication
- **Involve technical agencies for technical issues**
 - e.g., WHO or CDC
- **Train staff so that they can adequately communicate about the product**
 - e.g., the PSI project coordinator in Nigeria regularly quizzed staff to ensure that they can answer technical questions

Public sector co-investment often necessary to build private-sector HWT markets

Co-investment in distribution ensures supply

Retailers in many developing countries are cash-poor and cannot afford to stock a product with uncertain demand

- Retailers are risk-averse
- Credit often unavailable

Programs can support retailers to ensure steady supply

- E.g. PSI in Kenya deployed staff to encourage retailers to test the product and provide linkages to nearby wholesalers

To encourage retailers to try the product, provide initial supplies for free

- Retailers can use proceeds from initial sales to purchase additional stock

Co-investment in marketing stimulates demand

Programs can create and support private product/retailer marketing campaigns

- New product launch might otherwise be prohibitively expensive

Programs can design and distribute marketing materials

- Retailers cannot be expected to push sales
- Encourages HWT products are more visible in retail outlets



Poster from Zambia

Formative research and target group segmentation is key to selecting delivery channels and marketing mix

Employ formative research...

Consumer surveys

- Household surveys
- Focus groups

Purchase patterns

- For existing HWT technologies

Data on existing access to piped water supplies

- Including studies on water quality



...to drive marketing and distribution decisions

Marketing

- TV, radio, billboards, print

- TV, radio, billboards

- Radio
- Community outreach /inter-personal communication

Distribution

- Private sector

- Private sector

- Local micro-distributors
- NGOs
- Private sector
 - If outreach is sufficient

Conditions in each country (or even country) can vary, requiring research and customized campaigns

Social marketing is key HWT delivery approach

Multiple channels typically engaged

	Typical delivery channels	How-to	Strengths	Lessons learned
Social marketing campaign	Private sector <ul style="list-style-type: none"> Brand promotion Distribute HWT equipment and recurring materials via retailers 	<ul style="list-style-type: none"> Identify and screen potential partners Demonstrate the business case to private sector Determine need for subsidies 	<ul style="list-style-type: none"> Strong marketing expertise Distribution network with high coverage, esp. urban areas Sustainable as households make own buying decision 	<ul style="list-style-type: none"> Often requires public sector investment to build and initially serve the market Key to select local partners carefully to ensure quality
	Community / NGO <ul style="list-style-type: none"> Promote via community groups, community leaders, theatre plays, games, demonstrations 	<ul style="list-style-type: none"> Identify existing NGOs with access to target communities Identify whether an existing water, sanitation or hygiene program is in place 	<ul style="list-style-type: none"> Can increase coverage, especially in media dark areas High audience interaction Highly memorable messages if participatory elements are used, e.g. demonstrations 	<ul style="list-style-type: none"> Use trusted community persons to deliver messages, e.g. religious leaders Conduct cost analysis to determine if other approaches are more cost-effective
	Mass media <ul style="list-style-type: none"> E.g. TV, radio, billboards Does not include provision of HWT 	<ul style="list-style-type: none"> Research target beneficiary media usage and trust Develop messages that don't create conflict of interest 	<ul style="list-style-type: none"> Low cost per capita Highly memorable messages 	<ul style="list-style-type: none"> Ongoing campaign needed to reinforce messages If low coverage in rural areas, use other channels
	Public health system <ul style="list-style-type: none"> Integrated into regular health services Can include provision of recurring materials 	<ul style="list-style-type: none"> Encourage MoH to include HWT messages along with current services Make HWT part of job description & regular training 	<ul style="list-style-type: none"> Low incremental cost Sustainable as capacity is built 	<ul style="list-style-type: none"> As bandwidth commonly is low, train-the-trainer approach If coverage or frequency of visits are low, supplement with other channels

Schools also are key delivery channel, but don't cover target audience of P&L mothers or <5 children

Enabling beneficiaries to choose among HWT technologies increases sustainable uptake

If this is the highest priority...

Ease of use

- Volume of water treated
- Complexity
- Maintenance and cleaning requirements

Cost

- Upfront costs
- Recurring costs

Aesthetics

- Clarity/turbidity
- Taste

Safety of the treatment

...households may select this technology

Solar disinfection or boiling

- Must accept that only small quantities are treated at a time

Solar disinfection system

- Limited upfront or recurring investment required

Filtration system, with least taste impact

Chlorination system

- Highest degree of microbial efficacy

Example: POUZN program in India

- Local NGOs/women groups create awareness among beneficiaries for HWT need
- After creating awareness, various technologies are demonstrated using flipcharts, games and discussion rounds
- Beneficiaries decide which solution to adopt
 - Micro-finance solutions are provided through a partner to improve affordability for the poor

HWT product costs often passed on to consumers

Subsidies generally not needed; tend to reduce sustainability

Government/donors typically focus on funding programmatic activities

- Support program management, formative research, social marketing, M&E, etc
- Invest to build market for new HWT programs
 - e.g. provide subsidies to risk-share with manufacturers / distributors

Product costs typically borne by users

- Costs tend to be low, e.g. US\$0.01 / day / for chlorination
- Cost recovery rates are high
 - e.g. 14 of 17 PSI programs recovered full production costs in 2007
 - e.g. in Nigeria, 164% of costs were recovered
 - e.g. in PSI's Madagascar program, with lowest cost-recovery rates, 45% of costs were recovered

Programs often partner with microfinance institutions to enable poor families to finance their HWT investments

- e.g. POUZN in India cooperates with a microfinance institution to help poor families to afford ~ US\$40 filter systems

Free HWT equipment typically provided only in emergency settings

- Unofficial UNICEF recommendation

Rigorous selection of local production partners and ongoing quality control are critical for program success

Selection of production partner

- **Local production partners have to be selected based on technical knowledge and production capacity**
 - e.g., in Tanzania PSI first contracted a company that did not possess the required capacity
- **Site visits are essential to check companies upfront**
 - e.g., in Nigeria PSI was referred to companies that did not exist
- **Production practices and partners can change as demand increases**
 - e.g., in Zambia PSI produced the solution itself in the beginning as no company was interested due to the low production volumes; later PSI contracted a local company

Quality monitoring

- **An ongoing system for quality monitoring has to be established in the company**
 - e.g., PSI in Malawi urged the local company to place a production supervisor in the factory
- **External quality checks should be carried out continuously**
 - e.g., PSI in Malawi developed a test kit used by its staff to verify correct chlorine dosage of local manufacturers
- **Quality requirements should be included in contractual agreements**
 - e.g., PSI in Malawi required the local producer to submit a quality control form before payment of each batch

Marketing and distribution

- **Shelf life should not be set too conservatively as quick expiry means financial losses for retailers**
 - e.g., PSI's chlorine solution was first marketed with 3-6 months shelf life, that was later changed to 12 months
- **Packaging has to be appropriate for rural transportation and distribution**
 - e.g., chlorine bottles should not be loose but in plastic-wrapped packages that are still small and light-weight
- **Packaging has to be safe to prevent leakages**

Several communication channels from which to choose

Typically depends on situation-specific access to beneficiaries, costs and potential impact

	Examples	Advantages	Disadvantages
Interpersonal channels	<ul style="list-style-type: none"> • Community meetings • Door-to-door visits • Delivered by health workers, shopkeepers, teachers, project staff interactions 	<ul style="list-style-type: none"> • High impact in rural areas • Interactive delivery enabling discussion and clarification • Fosters higher local adoption if respected community members participate • Enables selective targeting 	<ul style="list-style-type: none"> • Low coverage • Low rate of message repetition • Relatively high cost • Requires high numbers of staff • Requires training • Less effective in urban areas
Local media	<ul style="list-style-type: none"> • Drama, songs sung by traditional musicians • Puppet shows, storytelling • Public announcements by religious or other leaders 	<ul style="list-style-type: none"> • High identification with source of information • Enables locally appropriate language and terminology • Fosters good memorization due to entertaining delivery 	<ul style="list-style-type: none"> • Low audience exposure to messages and repetition • Messages may be missed if people focus on entertainment or if messages are difficult to understand
Mass media	<ul style="list-style-type: none"> • Radio, television, video, films • Access to mass media is increasing, particularly in urban centers; radio ownership is high 	<ul style="list-style-type: none"> • Wide coverage • Low cost per person • Messages focused on a target audience e.g. soap operas • High impact as products are associated with desired lifestyle 	<ul style="list-style-type: none"> • Coverage in rural areas, poorer people • Developing spots is expensive • Message delivery not interactive
Printed materials	<ul style="list-style-type: none"> • Posters, brochures, leaflets, newspapers • Newsletters to project staff, health workers, shop owners • Product labels 	<ul style="list-style-type: none"> • Useful for providing instructions. • Labels always available when product is used • Newsletters useful to update on changes in product, project and FAQs 	<ul style="list-style-type: none"> • Can lead to misinterpretations • May not reach people who need them and when they need them • Cultural and language obstacles • Limited by literacy levels • Low behavior change impact

Need to address existing beliefs and create incentives in order to generate demand for HWT

Various beliefs reduce demand for water treatment

Don't believe that water is polluted

- Water looks clear, there are no visible features such as dirt or insects
 - *"Our water is clean"*
- Water comes from traditional sources that were already used for many years
 - *"We have drunk this water for years..."*



Don't believe that polluted water causes diarrhea

- People do not believe that diarrhea is caused by infected water but by teething, growing up, eating raw or green fruit, evil eye, etc



Oppose treatment for cultural reasons

- The "ideal" water is untouched and blessed, and therefore should not be treated



Incentives can induce behavior change

- Apply demonstration techniques that make the contamination visible to beneficiaries
 - H₂S strip test kit
 - Lenses to show cyclopes in water
- Leverage trusted information sources for the campaign, e.g. community/religious leaders
- Make water treatment perceived as a general practice that everyone does
- Make success stories visible to other community members
- Select treatment technologies that are culturally acceptable
- Let consumers choose among a set of treatment technologies

Marketing messages should be positive and aspirational

Message design

Campaigns should be positive and aspirational

- Campaigns should be focused on the positive aspects of HWT
- Consumers need to be inspired by images and messages to recreate them at their home

Campaigns should not focus on negative health consequences

- Does not provide a tangible and credible incentive to act upon for most beneficiaries
- Potentially leads to an association or consumer misconception that use of product causes diarrhea

Program examples

Pakistan

- Healthy and well nourished children visible on posters to inspire beneficiaries
- Positive message of empowerment: "You can trust water you have treated yourself"
- Positive message of feasibility and ease of use: "You can find the time to treat your family's water"



Mozambique

- Key claim: "Safe water, happy families"

Guinea

- Key claim: "For the good health of your family"

Employ creative methods to stimulate demand

Evidence compels beneficiaries' behavior change

Convincing demonstration process...

H₂S strip test kit used to demonstrate water contamination

- Water sample is filled in the test bottle and is kept for 24 to 48 hours at room temperature
- If bacteria are present in the sample, they produce hydrogen sulphide, which turns water sample black
- In parallel, one test kit is filled with treated water to show that the treated water remains colorless

Lenses used to demonstrate presence of guinea worm

- A drinking water sample is taken and looked at through a lens
 - If water fleas carrying the infective guinea worm larvae are present they can be seen by the beneficiaries
- The chemical Abate is used to kill the larvae-bearing water fleas
- Looking at the treated water again, beneficiaries realize the impact of the water treatment

...with low requirements

- The test kit is ready and simple to use, economical, light-weight, easily disposable and produces reliable results

- Equipment requirements are low and low-cost
 - One hand lens
 - Chemical Abate

Demonstrations can be either done individually or in a group setting

Community mobilization and participation creates awareness

Examples from large-scale HWT programs

The "Blue Bus"

Nicaragua



- An entertaining vehicle for mobilizing communities for healthy behavior
- Visited 120 communities in 12 months

Water testing days

Indonesia



- Children learnt about water cleanness through experiments
- Entertainment-education

Promotion at health-events

Indonesia



- Demonstration of water cleaning technology and benefits during an immunization campaign

Include safe storage containers in HWT programs to prevent recontamination

Criteria for safe storage vessels

Appropriate shape and dimension

- Transportability has to be ensured
- Standardized size makes chlorine dosage easier to communicate to beneficiaries

Appropriate and durable material

- Should be unbreakable and not hold pathogens or poisonous substances from prior use

Lid to avert contamination through dust or insects

Faucet or narrow mouth to tap/pour water safely and to prevent people from dipping into water with hands

- If this is not available the "2 cup" system should be promoted: one cup for taking out the water without touching it with hands, the other cup for drinking the water

Access to inside for cleaning

Costs of the container

- Common pottery ware jugs are often already available in households, whereas specially designed plastic containers add extra cost

Example: CDC Safe Water System

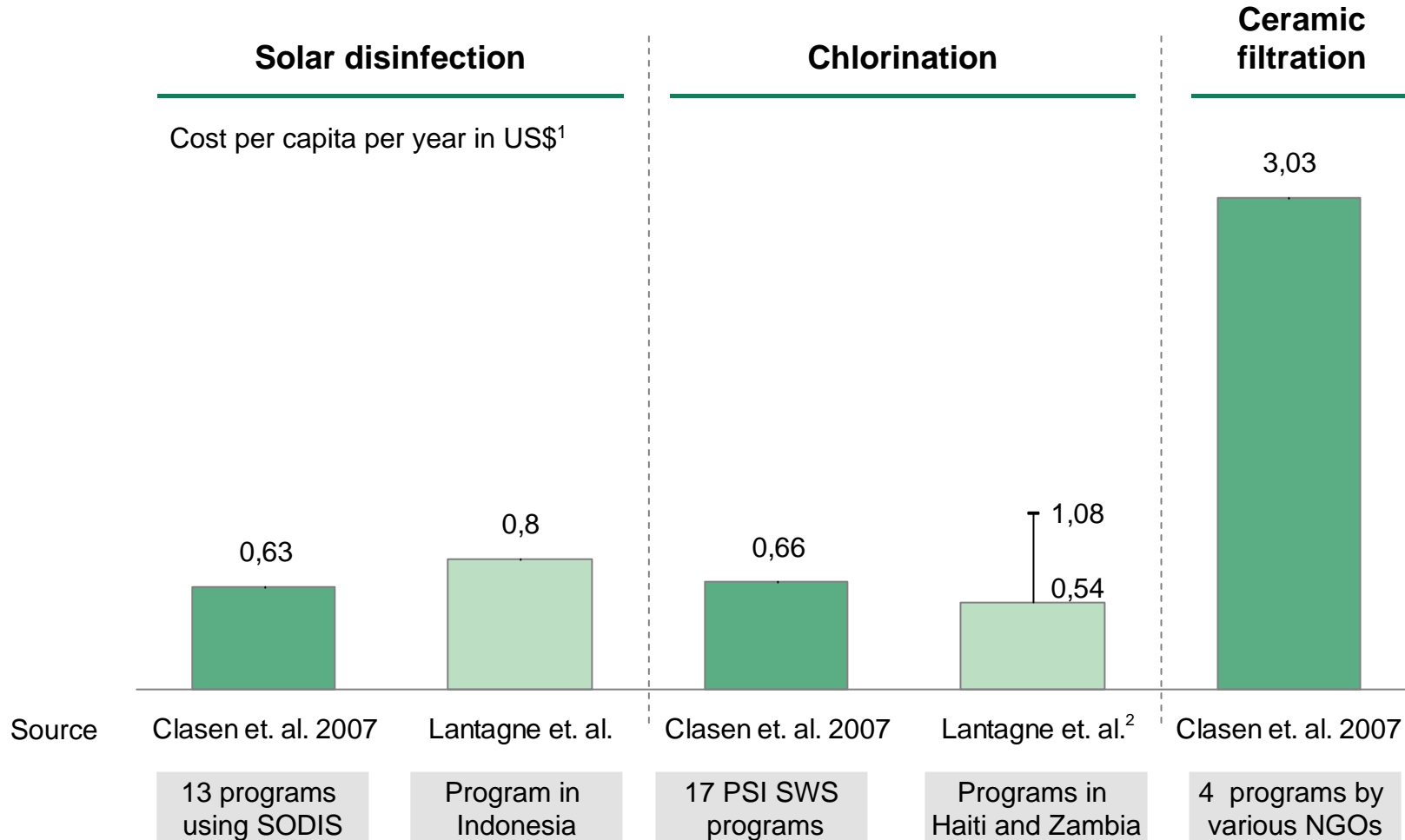
- Standard size: 20 liters
- Durable plastic that is easy to clean
- Screw-on lid
- Faucet
- Hand can reach in to scrub
- Expensive compared to other solutions, but lasts longer



Traditional clay pots and buckets are not recommended as storage vessels

What it costs

Solar disinfection and chlorination tend to be less expensive HWT technologies



1. Including programmatic costs and individual costs (i.e., costs paid by beneficiaries) 2. Not including programmatic costs
 Source: "Cost-effectiveness analysis of water quality interventions for preventing diarrhoeal disease in developing countries." Clasen et. al., 2007.; "Household Water Treatment and Safe Storage Options in Developing Countries: A Review of Current Implementation Practices." Lantagne et. al.

Set-up and operating costs vary across HWT technologies

	Solar disinfection	Boiling	Chlorination	Ceramic filters
Initial setup costs	<ul style="list-style-type: none"> • Minimal <ul style="list-style-type: none"> – Cost of black paint for bottles – Used bottles often available for free 	<ul style="list-style-type: none"> • None <ul style="list-style-type: none"> – Assumes availability of a pot 	<ul style="list-style-type: none"> • \$8 per household <ul style="list-style-type: none"> – Hardware for production and storage 	<ul style="list-style-type: none"> • \$25 per household
Operating costs	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Varies with fuel price • Rather expensive 	<ul style="list-style-type: none"> • \$3 per household <ul style="list-style-type: none"> – Depending on source of chlorine 	<ul style="list-style-type: none"> • \$5 per household <ul style="list-style-type: none"> – For annual replacement of filter

1. Estimate for the "CDC safewater system"
Source: "Managing water in the home." WHO, 2006.

Where to go for further information

Key reference materials: Household water treatment

Normative guidance

- "UNICEF Handbook on water quality." UNICEF, 2008
- "Guidelines for drinking-water quality, third edition." WHO, 2006

Operational guidance

- "Managing water in the home: accelerated health gains from improved water supply." WHO, 2002
- "Towards better programming. A water handbook." UNICEF, 1999
- "Safe Water Systems for the developing world: A handbook for implementing household-based water treatment and safe storage projects." CDC, 2000

Training materials

- "Safe Water System and Hand Washing Guide for Health Care Workers." CDC, 2005
- "Training Manual for SODIS Promotion." SODIS, 2006

Organizations: Household water treatment (I)

	Organization	Description	Key activities
Multilateral	UNICEF <ul style="list-style-type: none"> www.unicef.org 	<ul style="list-style-type: none"> UN Nations Children's Fund 	<ul style="list-style-type: none"> Implementing and supporting programs Advocacy
	World Bank Water and Sanitation Program <ul style="list-style-type: none"> www.wsp.org 	<ul style="list-style-type: none"> International partnership hosted by the World Bank to improve water supply and sanitation services 	<ul style="list-style-type: none"> Support of programs, e.g. ceramic filters in Cambodia Funding Advocacy
	WHO Network to Promote Household Water Treatment & Safe Storage <ul style="list-style-type: none"> www.who.int/household_water/en 	<ul style="list-style-type: none"> Network of 100+ partners (multilaterals, bilaterals, private sector, NGOs) promoting household water treatment and safe storage 	<ul style="list-style-type: none"> Organizes meetings and symposiums on HWT Advocacy Knowledge exchange, e.g. through listserv and provision of documents Promotion of research on HWT Survey of current HWTS implementations

Organizations: Household water treatment (II)

	Organization	Description	Key activities
Bilateral	USAID Point-of-Use Water Disinfection & Zinc Treatment Project <ul style="list-style-type: none"> www.psp-one.com/section/taskorders/pouzn 	<ul style="list-style-type: none"> USAID program managed under the Private Sector Program (PSP) aimed at expanding commercial production and sales of HWT products 	<ul style="list-style-type: none"> Implement diarrhea reduction projects using point-of-use water disinfection and zinc treatment
	CDC/Safewater <ul style="list-style-type: none"> www.cdc.gov/safewater 	<ul style="list-style-type: none"> United States public health agency 	<ul style="list-style-type: none"> Providing technical assistance Research Development and promotion of the SWS system

Organizations: Household water treatment (III)

NGO	Organization	Description	Key activities
	Population Services International <ul style="list-style-type: none"> • www.psi.org 	<ul style="list-style-type: none"> • NGO promoting social marketing to address health problems in malaria, reproductive health, child survival and HIV in more than 60 developing countries 	<ul style="list-style-type: none"> • Implementation of chlorination programs in multiple countries
	SODIS, Solar Water Disinfection <ul style="list-style-type: none"> • www.sodis.ch 	<ul style="list-style-type: none"> • Homepage of the SODIS project by The Swiss Federal Institute for Environmental Science and Technology 	<ul style="list-style-type: none"> • Provides information, technical support and advice to local institutions in developing countries for promotion and dissemination of SODIS
	IRC International Water and Sanitation Centre <ul style="list-style-type: none"> • www.irc.nl 	<ul style="list-style-type: none"> • Independent, non-profit organization supported by and linked with the Netherlands Government, the UNDP, UNICEF, WHO, the World Bank and the Water Supply and Sanitation Collaborative Council 	<ul style="list-style-type: none"> • Facilitates the sharing, promotion and use of knowledge to better support beneficiaries to obtain water and sanitation services • Using its web site, documentation, publications, IRC advocates change and aims to improve the information and knowledge base of the sector

Organizations: Household water treatment (IV)

	Organization	Description	Key activities
NGO (cont'd)	Centre for Affordable Water and Sanitation Technology <ul style="list-style-type: none"> www.cawst.org 	<ul style="list-style-type: none"> Registered Canadian charity Centre of expertise in water and sanitation for the poor in developing countries 	<ul style="list-style-type: none"> Provides education, technical training and consulting services to other organizations Advocacy
	International Scientific Forum on Home Hygiene (IFH) <ul style="list-style-type: none"> www.ifh-homehygiene.org 	<ul style="list-style-type: none"> NGO comprised of scientists and health care professionals who play an active role in hygiene policy and scientific research 	<ul style="list-style-type: none"> Publishes a newsletter (Home Hygiene and Health News) on latest news, research, events and library updates in the field of home hygiene
Academia	Massachusetts Institute of Technology / Water and Sanitation <ul style="list-style-type: none"> web.mit.edu/watsan 	<ul style="list-style-type: none"> MIT Civil and Environmental Engineering (CEE) web portal on water and sanitation projects in developing countries. 	<ul style="list-style-type: none"> Research Program courses in HWT Knowledge sharing

Organizations: Household water treatment (V)

	Organization	Description	Key activities
Private sector	Procter & Gamble <ul style="list-style-type: none"> www.pghsi.com/safewater 	<ul style="list-style-type: none"> Program managed by the P&G Health Sciences Institute which is part of Procter & Gamble 	<ul style="list-style-type: none"> Development of PUR Water Purifier in collaboration with CDC Implemented with partners through social marketing campaigns within its Safe Drinking Water program
	Unilever Hindustan <ul style="list-style-type: none"> www.hul.co.in/index.htm 	<ul style="list-style-type: none"> Indian subsidiary of Unilever 	<ul style="list-style-type: none"> Development and sales of Pureit Marketing through Safe Water Zones generating general awareness for HWT

Scaled-up programs: Household water treatment

Name/country	Implementing partners	Other information
PSI Zambia ¹	PSI, CDC, Ministry of health	<ul style="list-style-type: none"> • Social marketing of "Chlorin" • 1.8M bottles of Chlorin solution sold in 2004 • Multiple delivery channels and media used to increase consumer awareness
Safe Water System, Bolivia	PSI, CDC and other local partners	<ul style="list-style-type: none"> • Social marketing pilot was scaled up nationally • Children in intervention families had 0.12 episodes of diarrhea p.p., a reduction of 54% vs. control group • 3 months after launch, 50% of hh reported using the water vessel, 34% said they were using the disinfectant, and 19% had detectable levels of chlorine in their stored water
Safe Water System, Kenya	PSI, CDC	<ul style="list-style-type: none"> • Social marketing program • Project was expanded from pilot stage on to national level • More than 800K bottles of chlorination solution sold in 2005
Unilever India, Pureit system ¹	Unilever	<ul style="list-style-type: none"> • Private sector program with commercial interest • Product is distributed through retail networks and promoted using "safe water zones" • After a pilot program Pureit was rolled-out across India

1. Initial case study provided

Appendix: experts consulted

Experts consulted during preparation of this document

Name	Organization and title	Area of expertise
Walter Gibson	Unilever, Advisor for household water treatment programs	Implementation; private sector
Femi Odediran	UNICEF, Senior Water Advisor	Implementation
Camille Saade	Director, POUZN (Point-Of-Use Water Disinfection and Zinc Treatment)	Implementation; private sector