Regional Conference for SAARC Countries

Household Water Treatment and Safe Storage (HWTS)

Kathmandu, Nepal, 4-6 May, 2010

Contents

1.0 BACKGROUND

Globally there has been increased interest and use of Household Water Treatment and Safe Storage (HWTS) options as a key WASH intervention to deliver improvements in health. The evidence base to justify this for development situations is growing, but not without active debate and challenge about the extent of its effectiveness. The International Network to Promote Household Water Treatment and Storage (HWTS Network) has been at the forefront of leading discussions, exchange of experiences and data at the global level and through a series of national level meetings. However, good evidence for use of HWTS in emergencies remains limited, despite significant investments being made in stocks and supplies by agencies responding to emergencies.

Countries in South Asia are both active producers of HWTS options and users of these, alongside HWTS options produced outside the region. However the increasing use of HWTS options and strong market competition within South Asia can be confusing for communities/affected populations and agencies that purchase and distribute these options. Given that flooding affects many millions of people in some South Asian countries, rendering conventional supply options for often very dispersed population hard to ensure, emergency WASH interventions prioritizing HWTS are increasingly common. Criteria for purchase and use of options may be available for some organizations, but there have not been regional and national led discussions about option selection at a multi agency level, especially amongst emergency actors.

This conference was convened by UNICEF and WHO globally/regionally in collaboration with the HWTS Network and jointly organized by Government of Nepal, Ministry of Physical Planning and Works, UNICEF, WHO and Water Aid. This provided an important opportunity to gather together sector partners experts, and practitioners experienced in both emergencies and development work, and bring these actors up to date with the latest evidence base on HWTS.

The conference theme was “Making wise choices about HWTS option selection (in both developmental and emergency situations)”. The conference objectives were:

- Examine data and anecdotal evidence on use of the most significant (by scale and potential) HWTS options in South Asia.
- Refine global thinking to develop criteria for use in South Asia countries, (making a distinction between emergency and non emergencies as required) and apply “South Asian” criteria to current commonly used options and establish if the criteria and options make sense.
- Identify steps and support required to catalyze sector/cluster wide discussions at national level with view to move towards greater coherence of choice at the national level.

The conference was arranged over three days and covered thematic paper presentations from SAARC countries, presentations by global experts, group work and a market place. A local organizing committee comprising of MPPW, UNICEF, WHO and Water Aid Nepal was formed. The Committee was chaired by Mr. Krishna Prashad Acharya, Joint-Secretary, Water Supply and Sanitation Division of MPPW. Mr. Richard Luff Technical Advisor, UNICEF ROSA coordinated with regional and international participants, experts and partners. Since 18 Febr 201, the the Committee held eight meetings.

2.0 PROGRAMME OVERVIEW

Time	Session	Speaker/Lead
Day 1	**Tuesday, 04 May 2010:**	
08.30 – 09:00	Registration and Security briefing – *obligatory for all UN staff*	
09:00 – 09.15	Opening ceremony: Speaker Joint secretary Krishna Pd Acharya and Secretary Deep Basnyat	MC Mandira
09.15 – 09.45	Keynote presentation: HWTS within the broader context of drinking-water quality risk management"	Robert Bos
09.45 – 09.50	Closure of Opening ceremony	Krishna Pd Acharya
09.45 – 10:30	Review global evidence base for use of HWTS/POU	Tom Clasen
10:30 - 11.00	**Refreshment**	
11.00 – 11:45	WHO guideline for testing microbiological performance of HWTS/POU technologies	Joe Brown
11:45 – 13:00	HWTS/POU data and anecdotal evidence	Daniele Lantagne
13:00 – 14:00	**Lunch**	
14:00 – 15:30	Country presentation on HWTS experience: Afghanistan, Bangladesh, Bhutan, India	Moderated by Gorden Bruce
15:30– 16.00	**Refreshment**	
16.00 – 17:30	National presentation on HWTS: Maldives, Nepal, Pakistan, Sri Lanka	Moderated by Gorden Bruce
18.30 - 20.00	Social function - dinner at Wunjala restaurant	
Day 2	**Wednesday, 05 May**	
09.00 – 09.30	Summary of key lessons from national level HWTS/POU experience – plenary discussion	Rochelle Rainey
09.30 – 10.30	Creating demand/marketing for household water treatment options	Tom Outlaw (watershedasia)
10:30 - 11.00	**Refreshment**	
11.00 – 11.30	Global thinking on developing key criteria for option selection	Joe Brown (independent expt)
11:30 – 13.00	Group work to agree criteria for use in South Asia countries: 3 group in emergency situations and 3 on development situations and	Groups
13:00 – 14:00	**Lunch**	
14:00 – 17:30	Case studies	GoN/WHO /NGO
Day 3	**Thursday, 06 May**	
09.00 – 09:45	Review and refinement of criteria developed for South Asia countries ; Implementation and monitoring, presentation	Daniele Lantagne
09:45-10.30	Implementation and monitoring, panel discussion	Moderator Daniele
10:30 – 11:00	**Refreshment**	
11:00 – 11:30	Review and refinement of criteria and thinking developed for South Asia countries.	Group work
11:30 – 12:00	Plenary feedback from groups; what were the key points learnt about option selection and criteria development? and sharing	Plenary moderated by Richard
12.00 – 14:00	Market place for demonstrations of Household water treatment options – application of criteria to choose top 2 options	Private sector and others
13:00 – 14:00	**Lunch**	
14.00 – 15:00	Matching supply with demand for both emergencies and development; panel discussion. Private sector supply and Gov/Non Gov procurement considerations	Expert panel moderator Han Heinman
15:00 – 15:30	Identify steps and support required to catalyze sector/cluster wide discussions at national level	Groups by country
15:30– 16.00	**Refreshment**	
16:00 – 17:00	Identify steps and support required to catalyze sector/cluster wide discussions at national level (con) and feedback	Groups by country
17:00 – 17:30	Closing ceremony with remarks from rrepresentative from each participating country	Nam Raj and Richard

3.0 SUMMARY REPORT ON KEY SESSIONS

Opening:

The opening ceremony was chaired by Joint secretary, Mr. Krishna Prasad Acharya, with Mr. Deep Basnyat, Secretary, MPPW as the chief guest. Mr. Robert Bos gave the key note speech on HWTS covering global thinking, trends and challenges. The Chief Guest remarked on the importance of HWTS where we are unable to develop protected, controlled and regulated water supply systems. Mr. Krishna Prashad Acharya pointed out the various situations under which we need to make choices for HWTS and concluded by thanking the organizers, partners, experts and participants for attendance , especially as the national wide strike was making movement extremely difficult.

Technical presentations

- Review global evidence base for use of HWTS/POU by **Thomas Clasen** (independent expert): Paper highlighted the potential role of HWTS, evidence of effectiveness and issues in scaling up.
- WHO guideline and testing of microbiological performance of HWTS/POU technologies by **Joe Brown** (independent expert): Paper highlighted the new WHO guideline and effectiveness of various options of HWTS based on studies.
- HWTS/POU data and anecdotal evidence by **Daniele Lantagne** (independent expert): Paper presented sustainability of HWTS based on contemporary studies in Nepal (Cholera outbreak), Indonesia (Earthquake), Kenya (Flood/cholera) and Haiti (Earthquake).
- Creating demand for household water treatment options by **Tom Outlaw** (Watershedasia): Paper presented various demand generating techniques, including product innovation for fitting market to demand of consumers.
- Global thinking on developing key criteria for option selection by **Joe Brown:** Paper highlighted the key criteria from implementers and users prospective. This formed the basis for group discussion on developing criteria for option selection
- Implementation and monitoring of HWTS by Daniele Lantagne: paper highlighted various issues relating to implementation and monitoring of HWT options and lessons learned.

Market place:

Market Place for demonstration of Household water treatment options was opened on third day. Nine options were demonstrated by various parties. Following an open call for HWTS technologies, options made available for demonstration were; (1) Colloidal silver coated filter; (2) Chulli filter; (3) PUR; (4) Aquatabs; (5) Lifestraw Family Filter; (6) Bio Sand Filter; (7) Liquid chlorine products Piyush + Water Guard; (8) SODIS; (9) Solvaten. Many participants became familiar with new products for HWTS. The market place was used to apply the criteria developed by the groups earlier in the morning and allowed groups to rank the top 2 options for use during emergency and development situations.

Panel Discussions: Two panel discussions were organized on the morning of the third day.

1) **Implementation and monitoring**: Panelist were (1) Mr. Suman Shakya from ENPHO, Nepal; (2) Ms. Tanjeba Haq from BRAC Bangladesh, (3) Mohamad Masud, UNICEF, Pakistan, (4) Rajan Pandey, MPPW, Nepal, (5) Ms. Rochelle Rainey, USIAD, USA. Ms. Daniele Lantagne moderated the panel discussion. Each panelist

spoke on implementation and monitoring examples and their experiences. The panelist indicated the importance of integrating HWTS with other key WASH activities for achieving and linking technology with appropriate social intervention program. Communities themselves are the best monitor and feedback based on external or institutional monitoring helps communities/individuals change behavior

2) **Matching demand with supply in emergency and development situation:** Panelists were (1) Mr. Vijay Malik, Medentech, India (2) Mr. Ranju Anthony, Vestergaard, India (3), Mr. Sudhir Kumar Gosh, EE, DPHE, Bangladesh, (4) Mr. Birendra Shakya, SE, DWSS, Nepal. Mr. Han Heijnen moderated the panel discussion. The moderator asked Mr. Malik and Mr. Anthony to speak from the suppliers side and Mr. Shakya and Mr. Ghosh from the government, as purchaser, side. The panel discussed intensively on how the private sector can promote HWTS products in the community. Promotion of product to make it ease to use was stressed.

Group work: Three group work tasks were organised for; 1) developing option selection criteria, 2) refining and prioritising the most appropriate options selection criteria and 3) developing country strategy/action plans.

Group I: Developing option selection criteria: Participants were divided in to 6 groups comprising of about 8 members. Three groups worked for emergency and three for development situations. Group listed technical, economic, health and socio-environmental criteria, metrics of measurement and notes for clarification. In the group one member became reporter and one chair. Each emergency group then visited the development group and visa versa to listen to the differences between supply driven and demand led contexts.

Group II: Selecting best options from market place: Same six groups seated in separate round table and selected the priority criteria, generally one from each category. They then visited all market shops to evaluate the products based on selected criteria and identified the best two options for a given situation (groups could make their own assumptions and choose the situation).

Group III: Country strategy: Participants were grouped in country, though Bhutan and Maldives sat together as there were only 3 people. The group identified key strategic actions for their country for wise selection for HWT options during both emergency and non emergency situation. Groups did not limit themselves to strategy for option selection and they prepared strategy for promotion of HWTS and water quality.

Country presentation:
This session was moderated by Mr. Bruce Gordon, WHO Geneva. Papers were presented in two sessions. In the first session four papers were presented by Afghanistan, Bhutan, Bangladesh and India. In the second session papers were presented by Pakistan, Sri Lanka and Nepal. After each session the floor was opened for 30 minutes for questions.

Field Visit:
Four sites were selected for second after noon site visit so that participants could compare communities' criteria against the group criteria they have selected. In each site it was planned to make four teams comprising 3 - 4 participants and in each site four local facilitators and 8 households were selected, such that one facilitator would take one team tour to 4. One page

site note was prepared for each site. Unfortunately this visit was cancelled due to national wide strike.

Closing ceremony:
Representatives from eight participating countries were invited to the dais; Mr. Ali Mohammad from Afghanistan, Mr. Md. Kamal Uddin from Bangladesh, Mr. Ugyen Rinzin from Bhutan, Mr. Nagendra Prasad from India, Mr. Asfal Hussain from Maldives, Mr. Birendra Shakya from Nepal Mr. Sultan Mohamed from Pakistan, Dr. ADU Karuranathna from Sri Lanka. Each of the representatives made their remarks on the conference. Mr. Richard Luff thanked the organising team and at the end Mr. Birendra made closing remarks. A brief evaluation of conference was carried and a CD containing all presentations, documents and MP3 recordings were distributed to all.

4.0 OBSERVATIONS ON THE CONFERENCE

1. Participants rated the learning value gained and the conference overall between excellent and very good, being slightly above very good (see evaluation form in annex). The overall satisfaction of the conference was very high and points to the success and value of this conference. There was clearly a very high level of interaction throughout, which was a reflection of a good balance of group work, panel discussions, long breaks etc. Given that it was held during extremely difficult political circumstances (an almost total closure of the city), which meant that the field trip had to be cancelled, this is even more remarkable.
2. There was slightly less high achievement in the area of meeting the conference objectives. Conference objective 1 on the evidence base was considered mostly met. Objective 3 on national plan development was considered as mostly met. Objective 2. Defining criteria for South Asia was ranked as between mostly met and partially met. This is understandable given the process could only be initiated at this event and needs more work to reach completion.
3. The need for and the level of engagement in HWTS varies considerably across the SAARC region. Countries like Nepal clearly have a high level of engagement in HWTS, while Bhutan and Maldives have to date had little experience of HWTS. In the case of Bhutan, the conference has provided an excellent opportunity for the Royal Government of Bhutan to learn a great deal and for them to give consideration of whether their key WASH related policy should be adapted.
4. The extent of WHO and UNICEF cooperation at national, regional and global levels in order to ensure this conference occurred was significant, as it required a high level of financial/time commitment and determination. It will be critical if this level of collaboration can be mirrored at the national level in order to really move current HWTS work and the national action plans produced at this conference forward.
5. The conference enabled participants to start the conversation about development of selection criteria. There was some consensus around criteria such as supply chain, efficiency of removing pathogens, ease of use, life cycle, cost for consumer, cultural acceptability, affordability, yield per unit time as applicable. However bringing global generic guidance and national experience together to produce a widely agreed and clear national mechanism to select options requires a lot more work. Until this is done, the proliferation of HWTS products means that the ability of national actors to

encourage adoption of a just few demonstrated products, rather than many untested products, will be limited.

5.0 Recommendations

1. The development of national action plans, which was a key part of the conference, is a key step towards bringing a sharper and more systematic focus on HWTS at the national level. However, it will be necessary for these national plans to be followed up and key elements of these should preferably be reflected in WHO and UNICEF, and indeed other organizations, work plans in 2011 and beyond.
2. The UNICEF/Oxfam project which focused on 4 emergency situations globally clearly showed that large scale distribution or HWTS products during emergencies as effectively treating these as relief items, will only result in very low levels of effective use. Programmes must be designed to provide information and promotion/marketing alongside distribution of products.
3. The evidence base for effectiveness of HWTS in reducing water-borne diseases and optimal combinations of HWTS interventions in different settings is being progressively strengthened. In some areas such as emergency response, the evidence base is limited and further work is required. However more significant is the need to disseminate the evidence we currently have, especially at the national level.
4. The HWTS network at the international level is a key resource to provide expert guidance and latest evidence to assist in scaling up of the programme primarily in the development context. The WASH clusters at the national level, supported globally can be a key driver to encourage greater levels of coherence in national emergency response.
5. The 2008 JMP report included data that showed the extent of HWTS adoption at household level, though this was not included in the 2010 global report. It will therefore be necessary to reexamine national level data to understand where future focus should be made to improve household water quality.
6. The value of the private sectors increasing presence in HWTS is recognised and indeed will be a key factor to support local markets to provide products. However quality control through product appraisal and national certification will increasingly be required to guide both implementing agencies and consumers for an increasing range of products.
7. HWTS interventions should be integrated with overall water, sanitation and hygiene programmes so that communities increasingly have access to interventions that cover the whole range of critical interventions to reduce diarrhea. Single intervention HWTS programmes need to be designed and run alongside sanitation and handwashing with soap interventions, so households are comprehensively served with the critical interventions. This will require considerable work to map key actors and align programmes.
8. In emergency situations, HWTS options cannot be treated as Non Food-relief items by giving these out and assuming these will be used effectively.
9. Monitoring remains a critical challenge in all areas of programming and thus indicators should be simple, easy-to-measure, and relevant. Over specialisation and complexity may satisfy the rigour required for scientific study, but will not be achievable.

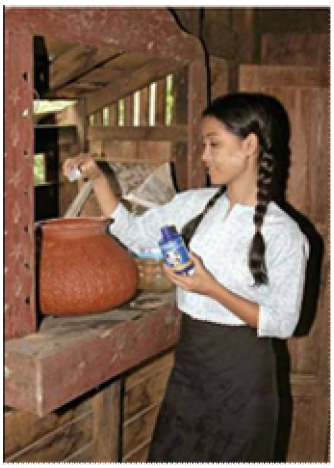
6.0 Next Steps

1. All SAARC countries are invited to continue with the development of national HWTS plans, together with strengthening existing HWTS activities. UNICEF andWHO will, to the extent possible, provide support for this national level work, alongside the other key national actors
2. Countries are encouraged to rationally align HWTS policy development and progamme implementation within a wider water supply, hygiene and sanitation perspective. A starting point for this would be to pro-actively plan for HWTS programmes in collaboration with implementing NGOs and others and ensure coherence of social marketing messaging with a view to long term behavioral change.
3. A review of action taken on the national action plans (see Annex d) around mid-2011 will help country teams follow up on these plans

ANNEX a) DETAILED SESSION DESCRIPTIONS

HWTS WITHIN THE BROADER CONTEXT OF DRINKING-WATER QUALITY RISK MANAGEMENT

Robert Bos, WHO Geneva, Email: bosr@who.int



Household Water Treatment and Safe Storage (HWTS) is also known as managing water at the "point-of-use" (POU) includes wide array of **treatment techniques**, e.g.: boiling, filtration, chemical, solar, and UV lamp disinfection, flocculation, etc. **Safe storage** prevents recontamination and includes the use of narrow-mouth, screened, and covered containers, and of taps and spigots.

884 million lack access to "improved" drinking water supply, 4 billion cases of diarrhoea annually, 88% attributable to unsafe water, sanitation and hygiene. 1.8 million die each year from diarrhoeal diseases, vast majority children under five. High returns for investment in drinking-water supply (between US$3 and US$34 for every US$ invested).
In response to limited cooperation among heterogeneous group it international level t of an International Network for HWTS has been established. Network comprise of Key organizations academic, bilateral agencies, NGO, UN-agencies, private sector entities, community organizations. The main purpose of network is expanding implementation of HWTS through appropriate police, research and awareness. HWTS alone will reduce burden of diarrheal disease by 19% in sustained manner.

Limitation of HWTS is that it places the burden of water quality management on consumers, demands consistent and sustained behaviour change, time investment and financial investments. In the condition that we have not achieved sustained public health impact and governments have not developed comprehensive policies or regulations addressing (non-boiling) HWTS options as part of their overall efforts to secure water safety HWTS needs to me promoted. Way forwards to achieve scaling up of HWTS are:

- Strengthening the evidence base for effectiveness of HWTS in reducing water-borne diseases in different settings and optimal combinations of HWTS interventions in different settings

- Stepping up promotion of HTWS with more attention for determinants of behavioral change in different settings and identifying new partners in the promotional activities

- Broadening the scope and pursuing integration by linking HWTS to efforts for household sanitation and hygiene

- Re-directing the HWTS Network for comparative more advantage through joint WHO/UNICEF hosting arrangement.

- Promote HWTS at the national level by emulating the international network at national levels, establishing national steering committee and exploring options for certification programmes.

REVIEW GLOBAL EVIDENCE BASE FOR USE OF HWTS/POU

Thomas Clasen, Independent expert, Email: thomas.clasen@lshtm.ac.uk

Systematic review and meta-analysis of 57 studies measuring bacteria counts for source water and stored water in the home showed that the bacteriological quality of drinking water significantly declined after collection in many settings. Hence policies that aim to improve water quality through source improvements may be compromised by post-collection contamination. Safer household water storage and treatment is recommended to prevent this, together with point-of-use water quality monitoring.

According to JMP data 45% HH uses HWTS including 33% boiling, 9% filter 1% chlorine 0.6% SODIS and others. Main challenge in HWTS is demonstrating the actual (generalisable?) effectiveness of HWTS for preventing diarrhoea in the absence of reporting bias (effectiveness). Study of Fewtrell et al revealed that relative risk after improvement of water quality at source is 0.89 and that of HWTS is 0.65 only.

Systematic review of Clasen et al revealed that overall effectiveness of HWTS for reducing diarrhea is 47%. The filtration (63%) is the most effective intervention and then floc/disinfection (52), chlorination (37) and SoDis (31%).

Study of Waddington et al revealed that water supply system intervention is not effective for reducing diarrhea where as water quality intervention is effective up to 42%.
Study of Jain et al carried in Ghana in 240 HH revealed that despite high compliance (measured by residual chlorine) and microbiological efficacy, no difference in episodes of diarrhoea

Study of Arlond et al revealed that risk of diarrhea incidence was lower when compliance was higher. A study carried by life straw personnel in 122 HHs revealed that consistence users of filters are only 13% who do not drink unfiltered water and current is only
34%.

Effectiveness study of a 3-year programme by NGOs in Guatemala to promote HWT (boiling, Sodis and chlorination) and HWWS carried in 6 month considering 600HH 30 village with half control revealed that there is no statistically meaningful difference in adoption of intervention and control households for HWT (9% vs. 3%) or hand washing with soap (HWWS)

Cluster-randomized controlled trial in 22 rural communities in Bolivia to evaluate the effect of SODIS in reducing diarrhea among children under the age of 5 found only moderate compliance with the intervention (32% regular uses) and no strong evidence of a substantive reduction in diarrhea among children

For scaling up of HWTS there is need of technology which is Highly effective against all categories of microbial pathogens, high capacity (daily and long-term production), easy to

deploy, learn, use, maintain, operates in high and variable turbidity, affordable (up front and long term), portable, robust design, Improves water aesthetics, attractive, inspirational, protects against recontamination, reduces arsenic and fluoride, reduces other chemical contaminants
There is increase use of WHTS with wealth. Program targeting vulnerable group is needed.

WHO GUIDELINE FOR TESTING MICROBIOLOGICAL PERFORMANCE OF HWTS/POU TECHNOLOGIES

Joe Brown (independent expert), Email: jeobrown@bama.ua.edu

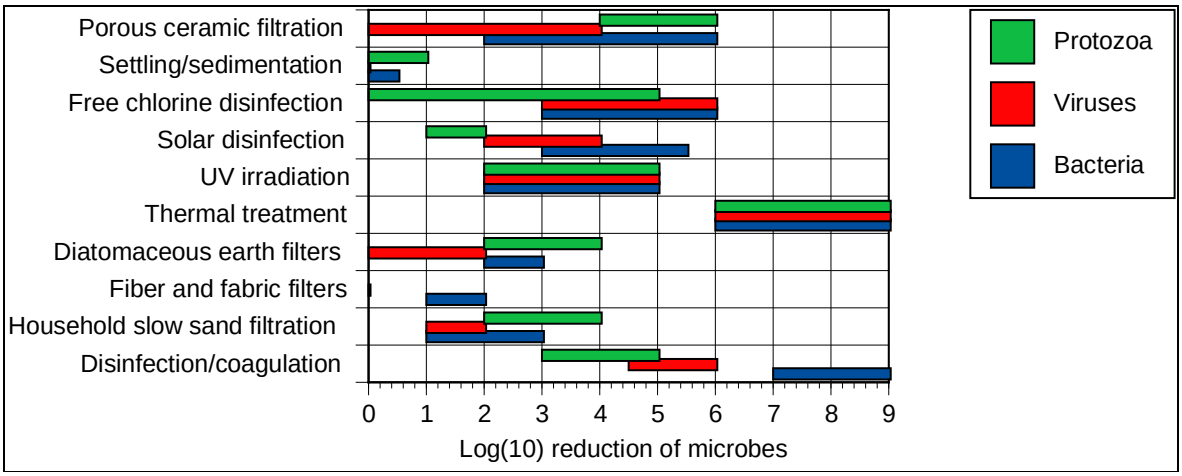
Which technology is the best? It is not easy to answer. It depends on context and point of view.
For implementers and NGO technology selection depends on Sustained, correct use by users, cost, and effectiveness in reducing microbes/chemicals and demonstrated health impacts. Similarly for user's selection of options depends on Acceptability and accessibility, user friendliness, cost, Aesthetic qualities and delivery of clean water that good for health.

WHO goal is to protect users and to promote public health through flexible framework and effective technology. WHO guideline can be interpreted and used in specific situation. Principle of the WHO guideline is to develop technologies which are as effective as possible against all classes of microbes: bacteria, viruses, protozoa. Published data are assumed for background water.

Guideline presented data for computation of reduction of microbes to achieve risk targets. For example 6 log reduction of cryptosporidium is needed. This will reduce to diarrheal risk per year to 6.817×10^{-4}. That means one among 1500 will have diarrhoea in a year. Guideline requires minimum log reduction value greater than 1 for minimum protection and greater than log 3 for moderate and greater than 5 for most protective measure for all bacteria, virus and protozoa. LRV for minimum protection is questionable.

Data shows that microbes per liter vary with days in the year. Some days are high risk days for some groups. 99.99% reduction will still have one high risk day left. Hence modest microbial reduction can prevent disease, sometimes dramatically.
Water quality testing protocol should be appropriate to institutional framework. Addition to field microbiological performance, health impact, evidence of sustained use, safe storage, chemical performance, flow rate, taste, turbidity, aesthetic may be considered.

WHO does not endorse or certify drinking-water treatment technologies. Can not use the WHO name or logo. These guidelines may provide the basis for national certification programmes that do engage in product certification and/or labelling. Requirements for labelling of products may be locally developed and should be approved by regulatory agencies at the national level.



HWTS/POU DATA AND ANECDOTAL EVIDENCE

Daniele Lantagne (independent expert), Email:danielelantagne@earthlink.net

Following four emergency response projects were evaluated:

- Jajarkot , Nepal for Cholera outbreak in august 2009
- Pariamn, Indonesia for Earthquakes in October 2009
- Turkana Kenya, Flood/Cholera in January 2010
- Haiti, Earthquake in February 2010

Options used seem agency or product driven rather than users driven. People knew about product however many people do not knew how to use exactly.

Country	Options	Reported Use	Confirmed	Effective
Nepal	Aquatabs	8%	87%	7%
	Piyush	16%	51%	8%
	WaterGuard	6%	56%	3%
Indonesia	AirRahmat	3%	--	--
	Tabs	1%	--	--
	Boiling	88%	31%	27%
Turkana	Aquatabs	13%	42%	5%
	PuR	6%	39%	2%
Haiti	Aquatabs	24, 75-92%	62, 75%	15, 54-66%
	Ceramic	72%	27%	20%
	Biosand	53%	20%	8%

There is large difference between distribution and efficacy. Result is discouraging in comparison to expectations of these options during emergency for reducing diarrhea.
Easy to use options, correct distribution, training for local adoption and responsive to emergency as it develops can lead to effectiveness of HWT options.

CREATING DEMAND FOR HOUSEHOLD WATER TREATMENT OPTIONS

Tom Outlaw (Watershedasia), Email:tom@watershedasia.org

WATERSHED is managed by UNC Chapel Hill working for Sustained Uptake and Proper Use of Commercially-Delivered WSH Products and Services Increased among Lower-Income Populations. It uses PPP approach for developing regional platform knowledge transfer and scaling up of opportunities.

The private sector has a strong role in addressing the sustainability of safe water technologies and business models to reach the underserved.
Appropriate marketing model fitting the market is needed to reach the product to needy people.

Demand can be generated by branding, commission based sales, on site demonstration or bundling. However consumer based product innovation is the right way of promotion.

Demand can be further generated through access to credit of climate change carbon trading.

Through appropriate channel, innovative produce with multiple benefits under socioeconomic and environmental situation gets in to lower income people.

IMPLEMENTATION AND MONITORING OF HWTS

Daniele Lantagne (independent expert), Email:danielelantagne@earthlink.net

What information do you need? Population, under 5children, diarrhea, treatment, knowledge and practices are the relevant information. During emergencies some specific information like affected/displaced population, time, response, coordinating and no of WatSan services are required.

Options for HWTS should be selected with few criteria in a coordinated approach. Ceramic filters, SoDis, Chlorine, Bio-sand filter and PUR are the most common options. There are other options too. These need to be tested in laboratory field and assessed for health impact and scalability.

No program is perfect. Every program has challenges. It is better to report them, learn from them and that is public health.

Monitoring indicators should be simple, easy-to-measure, and relevant. For example: Free chlorine residual, Filter wet, Product assembled in home, Product broken, People who picked up product, Presence/absence microbiology. Monitoring should be supported by qualitative information from assessed or self reported data.

What makes HWTS works? It is Quality product, Distribution, marketing, profit, Behavior change communication and User adoption that works.

SUMMARY OF COUNTRY PRESENTATION

Afghanistan: The country presentation of Afghanistan was made by Mr. Adane Bekele, WASH specialist UNICEF. His theme was status of Bio Sand Filter (BSF) promotion in Afghanistan. BSF was first introduced in Afghanistan in 2008 by Tearfund (INGO) and promoted by various agencies. About 5000 families are using BSF with support of agencies like Tearfund, DACAAR and UNICEF. Technology has been demonstrated in Mosque, school and market place where community people can see. Tearfund carried evaluation study based on 25 HH survey in Kapisa area where 432 BSF has been promoted. Study was focused on knowledge, perception, adaptation and effectiveness of BSF. In Capsa 68% people use canal water, 24 % well and 8% in combination. Turbidity removal efficiency of BSF is 83 % (17.7 to 2.9) and Bacterial removal efficiency is 93 % (4 to 0.3) 84% HH were found using, 8 percent intermittently and 8 dropped. !00 percent HH were found using for drinking, 92 % for food preparation and 26% for bath as well. Clean water was sufficient (60-80lpd) for HH. Only 50% remembered how to clean filter More than 72% family liked taste and smell and 100% appearance. 8% feel that health has been improved. More than 90% feel easy to use filter and think that it saves money.

Bangladesh: The country presentation of Bangladesh was made by Mr Sudip Kumar Gosh. Presentation was focused on POU technologies in emergencies. PUR and Aquatabs have been distributed in 4800 families of 67 villages during floods. A study was carried based on survey of 200 HH of 17 villages. Result shows that Both PUR and Aquatabs were efficient in destroying the total coliform and maintaining the low coliform counts for up to 24 hours of storage time. Follow-up education about the use of POUs at community level increased its usage from 20%-30% to 40%-60%. Preference for PUR was significantly higher compare to Aqua tab, possibly due to high levels of residual chlorine in Aqua tab with treated water.

Based on experience Bangladesh is looking forward to distribute treatment package integration with education, training and awareness raising; Manufacturing of disinfectant/treatment package should be explored in Bangladesh and engaging private sector in improvement, distribution, and establishing supply chain of treatment package in cyclone prone areas.

Bhutan: The country presentation of Bhutan was made by Mr Ugyen Rinzin. His presentation described WHTS/POU consideration in Bhutan. Boiling in traditional practice, SODIS has been promoted in school by UNICEF and planned for piloting of Bio sand Filters. Coverage of safe water is high but lack sustained quality assurance. Household level intervention is minimal. Bhutan is looking forward to incorporate HWTS in rural water supply policy.

India: The country presentation of India was made by Mr Nagendra Prasad. Government focus- hygiene behaviour and source protection. HWTS is not regular program in India. It is used during emergency only. Boiling of water is advocated during diarrhea outbreak and different kinds of HWTS has been developed and promoted to remove As, Fe, F etc at household level. Jalmai has been implemented as stand alone water purification program in the country.

Nepal: The country presentation of Nepal was made by Mr Birendra Shakya. Paper focused on Behavior change in use of HWTS. In Nepal water which is safe at source gets

contaminated in the system and even at households. However 75% people in rural still feels that water is safe for drinking. About 16% household practice different types of HWTS including 9% boiling, 1% chlorine, 6% filters and 0.2% SODIS with increasing rend. Governmental and nongovernmental agencies are active in promotion of HWTS in both urban and rural areas and trying to integrate in water quality and hygiene program. Sector partners carried a study in four districts of Nepal from 2005 to 20008 for observing behavior change. However there is minimum change in practice in comparison to knowledge change. Private sector and women groups brings added value to behavior change. Nepal is looking forward to integrate HWTS with water quality and sanitation and hygiene campaign. Experiences shows that appropriate social mobilization program sustain HWTS both in emergency and regular situation. Country uses locally produced chlorine liquid Piyush, Water guard, Aqua tabs during emergencies and outbreaks.

Pakistan: The country presentation was made by Mr Ali Mohamad from Pakistan. Prepared focused on HWT options during emergencies. Recent microbial water quality survey of major cities revealed that 75-85 % of the water supply is contaminated. Ministry of Health usually encourages boiling and disinfection of water during seasonal diarrhea outbreak. Boiling, PUR, liquid chlorine, Bio Sand filters, SODIS, Silver treatment and ozonation are the common options of HWTS. Their experience shows that HWTS is not a product and technologies but behavior change program which needs to be promoted through partnership.

Sri Lanka: The country presentation from Sri Lanka was made by Mr Sarath Wasala from Sri Lanka. Paper focused on use of HWT in rural area of Sri Lanka. Diarrhea incidence in about 3% (2006) in the country, however, outbreak occurs in some places and reach up to 40% around May. Boiling, chlorination, filtrations, SODIS and other advance treatments are practiced as HWT options. Different approaches such as awareness, technology, surveillance, water safety plan and legislation are adopted for quality control. Sri Lanka is moving forward to promote both WSP and HWTS in regular life and chlorinated water and sanitation during emergency cases.

CRITERIA FOR OPTIONS SELECTION AS WORKED OUT BY CONFERENCE PARTICIPANTS.

Technical

FACTOR	METRICS	NOTES
Ease of use	Qualitative	Easy to understand, handle and maintain
Durability	Working time	Specially for non chlorine products
Chorine dose	Free residual chlorine	
Adaptability	Qualitative	
Rate of treatment	l/hr or total treatment capacity	
Duration of treatment	Minutes	

Economic

FACTOR	METRICS	NOTES
Cost	$/litre	Material, transportation, awareness
Affordability	Willingness to pay	
Space for storage	M^3/for 1000pe	Counts package materials or treatment units volume

Health

FACTOR	METRICS	NOTES
Benefit	Incidence of diarrhea	After initial intervention
Hazardous if not properly used	Material safety sheet	Clearly written labels in local language

Social, environmental, other

FACTOR	METRICS	NOTES
Previous experience	No of experience	If people have experience of previous use
Ease of distribution	Households served	Weight, volume and doses fitting to local vessels counts
Acceptability	Taste/smell/appearance	
Local availability through other channels	Prepositioned and capacity of products	
Disposal	Amount of hazards residuals wastes	

Priority criteria:

1. Local availability and capacity
2. Supply chain
3. Efficiency to remove bacteria
4. Ease of use
5. Life cycle cost for consumer
6. Health benefit
7. Acceptability
8. Affordability
9. Yield per unit time (efficiency)

BRIEF NOTES ON SITES SELECTED FOR VISITES:

A.Budanilkanta, Kathmandu, Nepal

Bishnu, Budanilkantha VDC is situated 8 kms north of Kathmandu. The water is collected in the pond from the river named Rudreshwor and Chootte which is then distributed to the community people through tap.

The most promoting factors for the HWTS in Budanilkantha are education, radio, replication from others. The traditional water treatment system was boiling which is economically unsuitable because it takes enough firewood/gas/kerosene and time. So filtration (simple candle) is an alterative which are safest, least expensive and effective against most bacterial and viral pathogens disinfectants for household use. The communities people believe that treating water in home can prevent illness ant have not faced serious illness so far. The diseases like diarrhea, cholera are sometime observed in the area but not as epidemic.

B. Emadole VDC, Lalitpur, Nepal

Emadol VDC, lies on the eastern side of Lalitpur districts. Drinking water supply system is very poor in case of Emadole VDC. Most of the people collects drinking water from the well within their household premises and is then store in vessels. According to the communities, around 50% drink water after boiling. Similarly, around 70% use simple candle filter for drinking purpose. Almost, 85%% put potash in their well, frequently in June to September (rainy season). None of the community was found to be using chlorine in water storing vessels whereas 0.5% do SODIS and 0.4% use Solveten. The most promoting factors for the HWTS in Emadol is education, awareness program, radio, self consciousness, replication from others. Boiling water everyday for drinking purpose to family is very expensive according to the community people. So, they seem to be attracted toward Solvaten and simple candle filter. Once, there was a trend to add Piyush (chlorine) directly in water vessels without any treatment but the water from the well was so unclean, they stopped using it. Moreover, drinking Piyush added water gives odor as per them.

C. Chhochen Community, Lalitpur

Chhochen lies on the north from Mangal Bazaar. The main source of water in this community is ground water. There are 2-3 wells in the community. Other than this, there are no any alternatives for drinking water except buying purified jar water or from private company. The quality of water from well is turbid and slightly yellowish in color which gives odor while drinking without any treatment. In 2008 Cholera became epidemic in Lalitpur District, started from Gwarko, Pulchowk to Lagankhel. With the help of municipality, Enpho, and different health related organizations, UEMS execute different programs like bucket chlorination in well, distribution of Collider Silver (CS)/Simple Candle Filter, Piyush/Water Guard (Chlorine),

SODIS bottles. Moreover, different awareness activities were conducted like wall painting, documentary show, street drama, awareness Champaign in schools, colleges, community level training (focusing women group). In 2009, the epidemic of cholera was fully eradicated from Lalitpur District. In 2009, community is declared as safe zone by ENPHO. According to the community, maximum numbers of people follow SODIS (32%), as they were distributed with specially designed SODIS bottles. About 15% of household purify water by boiling and only 10% use Piyush/Water Guard for drinking purpose (EnPHO, 2009). SODIS is the cheapest and easiest method to get pure water compare to all because it just need some bottles, water and sunlight. Besides that, filter even though need enough time to purify, it is also one of the easiest way to get disinfect water. But boiling water everyday for entire family is very expensive according to the people. It not only cost more but also decreases the taste quality. However, they believe that boiling makes water 100% free from germs which is good for health.

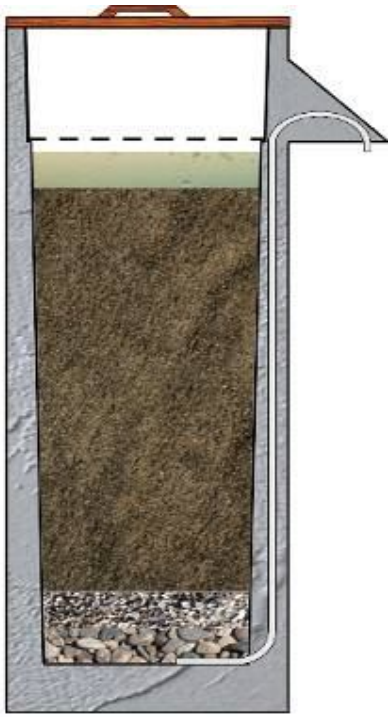
D. Lonh la Community, Lalitpur

Lonh la is the small community, 50 m far from Chhochen of Lalitpur District. The main source of water in Lonh la community is well (only one) which dried up since 4-5 years. Urban Environment Management Society (UEMS) with the help of community people reconstructed it but found that the water is undrinkable. The community people therefore installed biosand filter themselves, in the same well. Lonh la is also declared as the safe zone by ENPHO in terms of causing water born disease. Community highly introduced with Household Water Treatment and Safe Storage System (HWTS) option like CS (Collider Silver)/Candle Filter, Bio-sand Filter (Community), SODIS, Piyush/Water Guard. According to the ENPHO, around 7% of household boil water before drinking. Similarly, 10% follow SODIS whereas only 5% mix Piyush/Water Guard in drinking water. Maximum number of household of about 53% use candle filter for water disinfection whereas only 3% use CS Filter. Likewise, around 25% of household use candle filter and 2% use CS filter after boiling. In addition, around 2% do boiling, filter and keep it for SODIS.

The most promoting factors for the HWTS in Lonh la community is education, awareness program, training, street drama, documentary show, wall painting. The community is more attracted toward the bucket chlorination and bios-and filter because they can filter huge amount of water in short period of time.

DEMONSTRATION/ MARKET PALCE FOR HWTS OPTIONS

Aquatabs: Aquatabs is manufactured by Medentech Ltd, Ireland. This water purification tablets have been used for humanitarian aid by many world's leading aid agencies. Aquatabs water purification tablets are made with NaDCC known also as sodium dichloroisocyanurate or sodium troclosene. Tablets are dry and are non-hazardous to transport, extremely light and compact made under strict pharmaceutical standard GMP approved conditions in the British Isles and have a 5 year shelf-life. It is available in 5, 10 and 20 liter capacity internationally. Cost of 5 liter tablet is Rs 1.25 including label with instruction in local language. ie **Rs 0.25/liter**.



Bio Sand Filter (BSF): It is adaptation of traditional slow sand filter (SSF) for household use. The filter container can be made of concrete, plastic or any other water proof and non toxic materials. The container is filled with filter media (sieved and washed sand and gravel) with 5 cm standing water height. As in the SSF a biological layer developed in the surface contributes to treatment.

Suspended materials and pathogens are removed through combination of physical and biological process. It treats 0.4l/min in batches with 2 to four batches in a day and pause time 6 to 12 hours. Pause tie should not be less than 1 hour and more than 48 hours. One filter can treat up to 72 liters in a day. It can be constructed locally with steel mould.

Cost of installation in Nepal is ***Rs 3000***. BSF removes 96% Bacteria, 99% virus, 100% helminthes. Turbidity comes down to less than 1 NTU. Hence nominal chlorination is still recommended with BSF. This has been used in many part of the world.

Chuli Filters: This is a modified cooking stove where the chimney is fitted with an aluminum pipe coil. Flow of water and coil length is so maintained that water reaches more than 60 degree Celsius and sustained for at least one hour. Under such condition it is believed to be pasteurized and suitable for drinking. Cost of aluminum coil is Rs 500 and total cost of installation is less than Rs 1000.

Colloidal Silver Filter: Colloidal Silver Filter is an effective technique of removing pathogens from drinking water. The filter has clay disc or candle coated with silver. The candle block strains solids and certain microorganism and silver kills the micro-organism that comes in contact with silver. Hence silver acts as an antibiotic. This technology was developed by CAIT in 1981. This technology is in use in many part of the Asia. International development Enterprise (IDE) conducted pilot project in Nepal and being manufactured and marketed as by Sofa Filter. Its cost is about Rs 500

LifeStraw Family Filter: This is **Life straw** family product for point of use microbiological water system intended to routine use in low income settings. It filters up to 18000 liters of water and enough to supply family of five with clean water for three years. It complies with USEPA 1987 guide

standard. According company profile it removes bacteria by 6 log, virus by 4 log, protozoa by 3 log and completely removes turbidity. Its main part is membrane cartridge where ultra flirtation takes places through 20 nanometer pores and retains bacteria, virus and parasites. Halogen chamber releases low level chlorine to prevent membrane fouling. Vacuum tube backwash system is also there. Clean effluent was demonstrated from dark turbid and drunk in the site. It is available world wide and cost of one unit Rs 1800

Piyush(liquid chlorine): This is product of Nepal Environmental Health organization (ENPHO) started in 1994. It comes in 60 ml plastic bottle with 0.5% sodium hypochlorite concentration of chlorine. Three drops of liquid as it drops from the nozzle fitted in the lid is sufficient for treating one liter water. One bottle is enough for treating 400 liters of water which is sufficient for family of 5 for one month. It giver more than 0.2 FRC. Cost is Rs 15/bottle ie Rs 0.04/liter

PUR: It is product of P&G Company, USA. It is a powdered water purification technology packaged in 4 gm sachet. it works like a dirty magnet pulling dirt and contaminants out of unclean water. It uses same principle as municipal water treatment system and provides frc so that water remains usable about a day.

Contains of one sachet PUR powder is added in 10 liter water and stirred to begin process of precipitation and coagulation. Further it is stirred for 5 minutes to till floc formed and water become clear. Then water is filtered through 100% cotton cloth. Then 20 minutes are allowed before drinking for disinfection. According to company profile it removes bacteria by 8 log, virus by 7 logs, parasites by 6 logs. It also removes heavy metals and pesticides. It works up to 500 NTU. Cost of 5 sachet is 1 Rs ie Rs 0.02/liter. Product is available internationally and useful during emergency where clean water is not available.

Solar disinfection (SODIS): SODIS is done by filling clean, unscratched, uncrushed and transparent PET plastic bottle(maximum 10 cm diameter) with water and exposing it to direct sunlight for about 7 hours. Synergic effect of ultra-violet(UV) rays heat from the sun kill the germs in the water. It was first discovered by Prof. Aftim Acra of American University Beirut in 1985 and EWAG/SAVDEC has carried various research in this technology. Any one knowing concept can adopt this technology at zero cost as long as required bottles are available. Some specially prepared bottles are also available. SOLVATEEN is a SODIS based technology in which water can be treated @ 10 liter in a batch. It has been fitted with indicator for seeing that water reached required temperate.

Water Guard: Population Services International (PSI) introduced water guard in 2005. It is 0,72% sodium hypochlorite solution available in 240 ml bottle. Water Guard bottle has a measuring scale provided on the lid of bottle. Lower indicator for 10 liter and high indicator for 15 liters.

ANNEX b) PARTICIPANTS LIST

SN	Name	Country	SN	Name	Country
1	Mr. Adane Bekele	Afghanistan	31	Mr. Joe Brown	Network
2	Eng. Ali Mohammad	Afghanistan	32	Mr. Thomas Clasen	Network
3	Ms Tanzeba Haq	Bangladesh	33	Ms Daniele Lantagne	Network
4	Mr. Md. Kamal Uddin Ahmed	Bangladesh	34	Mr. Richard Luff	Regional
5	Mr. Shafiqul Hasan	Bangladesh	35	Mr. Sultan Mahmood	Pakistan
6	Mr. Sudhir Kumar Ghosh	Bangladesh	36	Mr. Abus Sobhan	Bangladesh
7	Mr. Ugyen Rinzin	Bhutan	37	Mr. Henk Van Norden	Regional
8	Mr. Karma Wangchuk	Bhutan	38	Mr. Bruce Gordon	Global
9	Mr. Nagendra Prasad	India	39	Mr. Robert Bos	Global
10	Mr. Rajni Kant Pandey	India	40	Mr. Andrew Trevett	Nepal
11	Dr P.Mariappan	India	41	Mr. Madhav Pahari	Nepal
12	Mr. A. H.Malik	India	42	Ms Yan Zheng	Bangladesh
13	Dr Suman Kumar Shakya	Nepal	43	Mr. Chandra Sharma	Global
14	Mr. Birendra Man Shakya	Nepal	44	Mr. Samuel Luzi	Global
15	Ms Binu Bajracharya	Nepal	45	Ms Rochelle Rainey	Global
16	Mr. Kamal Jaishi	Nepal	46	Ms Lisa Casanova	Global
17	Mr. Roshan Raj Shrestha	Nepal	47	Mr. Jan Willem	Global
18	Mr. Mahendra Matho	Nepal	48	Mr. Han Heijnen	Global
19	Mr. Ranjan Raj Bhattarai	Nepal	49	Ms Laura Schulert	Global
20	Ms Arinita M Shrestha	Nepal	50	Mr. Victor Lara	Nepal
21	Mr. Guneshwar Mahato	Nepal	51	Mr. Tom Outlaw	Global
22	Mr. Nanda Bahadur Khanal	Nepal	52	Mr. Afsal Hussain	Maldives
23	Ms Sharada Pandey	Nepal	53	Ms Linda Kentro	Nepal
24	Mr. Rajan Pandey	Nepal	54	Mr. Ranju Anthony	Private
25	Ms Biju Dangol	Nepal	55	Mr. Vijay Malik	Private
26	Nam Raj Khatri	Nepal	56	Mr. Suraj	Private
27	Mr. Muhammad Masud Aslam	Pakistan			
28	Mr. Mohamoud Magan	Pakistan			
29	Dr Jamal Abdul Nasir	Pakistan			
30	Mr. Mukhtiar Sahto	Pakistan			

ANNEX c) EVALUATION OF THE CONFERNCE

Household water treatment conference
Evaluation Form

Your Name: (Optional)_____

The conference objectives are

- Review global evidence base for use of HWTS
- Refine global thinking to develop criteria for use in South Asian countries and apply "South Asian" criteria to current commonly used options
- Identify steps and support required to catalyse sector/cluster wide discussions at national level.

****Objectives met or not met. 5 = Fully 4 = Mostly 3 = Partially 2 = slightly 1 = Not at all**

Objective	**Key sessions that relate to objective**	**Objective ranking** **Please circle according to your view (ranking explanation above**)** **Please also comment**
Review global evidence base for use of HWTS. ***Qu: Do you now have the understanding and information to know how and why HWTS plays such a significant role?***	Tuesday 4th May all morning Wednesday 5th May session prior to morning refreshment break Thursday 6th May panel discussion	5 4 3 2 1 **Average 4** • Clearer distinction between development and emergency could have helped • Country presentations often not very comprehension • This is the very important issue of HWTS many male, female and children affect from water born disease. So the information given are very good. • Introduction of simple & easy HWT options for the reduction of water borne diseases such as diarrhea. • First 2 presentations indicated that HWTS would not contribute in economic and health sphere – but confusing statement.
Refine global thinking to develop criteria for use in South Asian countries and apply "South Asian" criteria to current commonly used options ***Qu: Are you able to critically think through all the key factors to understand how***	Wednesday 5th May session after refreshment break Wed 5th May field trip Thurs 6th May demonstration	5 4 3 2 1 **Average 3.7** • Selection of options may be appropriate for emergency for development, it may have been more fruitful to discuss approaches, strategies for integrated multi –option) promotion • Two options were given development and emergencies. We discussed about this and are able to understand critical think. • Unfortunately field trip could not be arranged.

to go through a process of wise/good option selection?		• Diff. criteria for selection of HWTS options during emergency and development phase. Limited option choices.
Identify steps and support required to catalyze sector/cluster wide discussions at national level ***Qu Were you able to develop a series of steps/actions to encourage HWTS understanding and take up at the national level***	Thurs 6th May group work in afternoon	5 4 3 2 1 **Average 3.9** • Yes, of course. Able steps/action awareness, campaign; marketing of supplies, community affordable and community acceptable • Could have used more time to refine/ brainstorm / devil's advocate within country groups – nice to have some seed money to offer – might need to follow up to encourage submissions. • Much capacity needs building • Diff. stakeholders working together. • Limited time hinder to develop a solid action plan.

PLEASE TURN OVER FOR ADDITIONAL QUESTIONS

ADDITIONAL QUESTIONS - Please respond to the questions below.

1**. What are the TWO most important things you learned during the conference?**

- Relationship between safe was and PLWHA
- Seen physically 10 different HWT options (never seen 3 of those before)
- The relation to the HWTS towards the developing world with respect to water and safety.
- Using of deferent options of HWT Tech.
- Development of Technology raised here
- Availability of various HWT options
- Status of promotion of HWTS in SAARC countries
- House hold water quality techniques, experience of all countries
- Different HWTS techniques
- Status of drinking water in different SAARC country and their own way to treat it
- Integration of HTS into water and sanitation services
- Need of coordination among Govt., INGO, NGOs, Private sector
- Emergency use settings and relevant considerations
- Adapt solutions proposed to local conditions
- Importance of certification protocol (Joe Brown)
- Evidence of health impact probably exaggerated
- Log reduction differences on health impact.
- Very little disagreement that chlorination is best HWTS technique in emergency
- HWTS strategies for integrated HWTS promotion
- HWTS used in SAARC region.
- Reduction in risk for each log reduction in contamination
- The dynamic activities taking place as public private partnerships to increase options
- Many options to HWT
- Other country experiences.
- Necessity of linking HWTS with National Drinking water quality standards, Nepal
- Experience on success limitation of different HWTS
- Different criteria developed in consultation programme
- Local perspective
- Many options for HWT available

- Planning & awareness (Health & hygiene)
- HWTS system
- HWTS is the must for normal / emergency situation
- People are not aware to use HWT's in development situation
- Household water option selection
- Performance of different HWTS
- Selection criteria
- Criteria for selection of HWT options during emergency and development
- HWTS very important and useful for PLWHA
- Social marketing critical HWTS promotion – reinforced belief I had.
- Product selection / consideration of several features.
- Different technique for HWTS
- Methodology for adaptation of HWTS
- Global thinking on HWTS
- Various technology options of HWTS
- Worldwide best practices of HWTS
- Knowledge about the products (HWTS)
- The selection criteria on the ----- of the HWTS
- The need to conduct water quality before the selection and implementation of HWTS
- HWTS in Emergency
- HWTS in Development
- Introduce of comprehensive ula----tias
- Important role of Riuste(???) section
- HWTS options, planning strategy
- Effectiveness including other major findings of BSF evaluation conducted in Afghanistan
- Different options of HWTS
- Strong awareness and BCC activities need to use HWTS
- Activities for emergency and development situations
- Knowledge sharing and experience share with each other
- Learn more knowledge in Regional level and HWTS situation
- Health impact of HWTS hard to measure and unclear
- HIV/AIDS as extremely vulnerable population
- Networking with other stakeholders
- WHO position on HWT and plans forward country activities for HWT
- Integration and standardization – Cambodia experience
- Case studies – HWTS – Danielle presentation
- Importance of water safety at house hold level
- Different methods for house hold water treatment methods
- The differences between the capacities of the SAARC region countries
- What is already happening at the country level
- The WSP measures input as well as outputs, perhaps more.
- Impact of HWTS in reducing diarrhoea disease still needs greater evidence base.

2. Were any critical themes missing or inadequately addressed in this conference? If yes, which ones?

- Only House was focused and tea shops, schools, workplace, weekly bazaars etc. were left out
- Nepal country paper could not convince me. I was totally caught unaware
- Linkage with sanitation and hygiene
- Nothing I guess
- Hard to address in conference, but attention to actual follow up
- Is really important if all the plans are to mean anything.
- Some more background information on performance aspects and vis-à-vis risk management of HWT technologies
- Where and what is the sector going to position HWT + storage
- More attention to developing the enabling environment
- More participation of marketing (commercial) experts
- More address bio-sand filter which was most important

- The importance of local community level advocates – this conference did not focus on implementation, but important to remember we need to identify and cultivate these "champions: of HWTS.
- Clarification between the need for WSP and HWTS
- Gender
- Behaviour change
- Safe storage
- Separate HWTS for Development and emergency
- Lack of strategy to promote HWT options at local level.
- Field visit due to national strike (beyond control)
- Specific problems related to specific country
- How to integrate HWTS into regular WASH programme
- What are the steps to include HWTS into school WASH program
- Marketing and social response part of HWTS
- No
- Technical efficiency reference of all
- HWTS adopted by different country
- Role of Riuste (??) section
- Links of H. water and Sanitation
- Discussion on new option of HWTS
- Cost / Benefit analysis for options remain lacking
- Themes of technical, social, economical issues are not well separated
- Multi-barrier approach to household waste treatment
- Greater distinctive between emergency and development context too often they will confuse and mix together.
- Not discussed about most inexpensive way to sterilize the water – boiling of water.
- The distinction between different types of ceramic candle and colloidal silver filters
- I had to miss the 2nd day due to Embassy security restriction or perhaps my 1st pa--- would be higher! More links of safe drinking water with nutrition and physical and cognitive growth

3. How would you rate the learning value gained?

Excellent ☐ **11** Very good ☐ **19** Good ☐ **10** Fair ☐ Poor ☐

4. What is your overall rating of this conference?

Excellent ☐ **13** Very good ☐ **19** Good ☐ **7** Fair ☐ Poor ☐

5. What is the ONE thing that would most improve this conference?

- Make choice more wisely on HWT options
- Small documentary show from different countries could be plus point in the conference.
- Field visit
- More reflection at country level (what is happing, what is required, where are weaknesses / strengths followed by critical reviewing and support for country plans.
- Conference organization was good, time was kept well. Very pleasant experience even thought the 'Bandh' setting in Kathmandu made the organization somewhat difficult.
- Making use of "simulation exercise" activities as used for training workshops
- No strike
- In this conference, I improve more our program regarding field house hold water treatment. I improve my knowledge that water testing by laboratory and by community as important and necessary. Local technology should be focused and before introducing technology all should see the economic conditions of community.

- Field visit. (though it was planned but unfortunately could not be done due to political condition.)
- MOU structured interaction between participants early on, so conversations during tea breaks would be even more productive
- Integrating with field trip
- Specific guiding note for group work
- More private sector participation
- Integration on HWT's
- More weight should be should be given to regional base sources
- Field trip should be mandatory in such a workshop
- Field visit (though it was planned)
- More focus on case studies focusing on success and failure stories.
- Sharing of best project in South Asia which had considered all components and strategy for HWTS successful implementation.
- Very well done, no comments.
- Please organize such conference in a conducive political situation to get full participation.
- Research finding of different countries
- The issues for the discussion and the topics selected for presentation.
- Refreshing entertainment between sessions
- Broader evidence – based presentation from countries
- Proper time meeting
- Sharing of the success stories that worked well and can be used as role model and lessons for implementation
- More participation from relative stake holders and organization as well WASH focal person social marking people also.
- Strengthening evidence base for use of HWST in development context and addressing its sustainability
- More time for group work and discussions
- Emphasis the importance of thinking of safe water at house hold level
- Not having bandh! Organization was great.
- Very very good. One of the best run conference I have attended. Very impressive collection of expert resources. Thanks for including USAID!

ANNEX d) NATIONAL ACTION PLANS

AFGHANISTAN

Action points:

- Review the existing feed back to WASH cluster or WSO. Quality data (from the protected and unprotected sources)
- Review the existing HWTS practice
- Mapping the emergency type in the country
- Mapping the existing HWT option
- WWW (NGOs) (IPs) based on this the above information conduct on the house hold water treatment and storage in the country (or 3 days workshop)

The expected result of this workshop will be:

- Define a criteria for the selection implementation of HWTS
- Develop an action plan for the implementation of agreed point in the conference
- To define M&E of HWTS

BANGLADESH

Team: DPHE/OXFAM/BRAC/WHO/UNICEF

Objectives:

- Assessment of the microbial water quality at household level
- Evaluation of HWTS for emergencies and development

Situational:

1. Compile existing microbial water quality data/reports for source water & drinking water

Activities: June 1, 2010 – May 31, 2011

1. Need to assess:
   a) WHO RHWT – Completed
   b) MICS microbial test – prepared
2. Emergencies/WASH cluster – Tech. Comm
   a) Criteria for HWTS established – (Deliverable 1)
   b) Evaluate options against criteria
   c) Research/Explore new, local? Options
3. Development/DPHE – NGOs – UNICEF
   a) Criteria for HWTS established (Deliverable 2)
   b) Water scarcity area – RWH safety
   c) Suspicious source water: PSF, Dug well, Pond/River, very shallow well 50ft.

BHUTAN

Title: Provision of HWTS focusing on safe storage with RWH

- Team members: PHED (NL)/Health Sector/Engineer; .(district file)/Health worker, (BHU)/Community representatives
- Objectives: To assure the quality of water collected through root RW
- Reference: Lack of existing water treatment system.
- Brief situation analysis:- No situation analysis done.

Proposed methods and procedure:-

- Initial configuration/Q/T in pilot project
- HWT options – Bio sand filter, Aquatab, SODIS, PUR

Activities/Timeline (October 2011)

- Community consultation w/shop

Expected product

- Access to safe water from the RWHS
- Confirmation of appropriateness of options

INDIA

1. Water quality affected areas (both chemical and bacteriological) where we do not have any other options, HWTS can be promoted with the community participation
2. All schools will have stored alone water purification system as per latest NRDWP to reduce the vulnerability
3. In parallel, Hygiene promotional activities ....., handling etc, which is very much part of the TSE is being implemented across India.
4. India being emergency prone country, depending on the requirement of regions and the nature of emergency, most appropriate HWTS with the possibility to link with the normal developmental programme

MALDIVES

Title: Provision of HWTS focusing on safe storage of RW.

Objectives:

- To provide safe-drinking water
- Insure the quality of rainwater with NWQG

Team Member: In collaboration with; Government /MHTE/OHF/NHL/EPA/UNICEF/WHO/ Province Office/Island office/Community Development Council

Relevance to the promotion of HWTS:-

- Lack of any existing rainwater treatment system/facility
- Dependence of the community to RWH due to availability of portable water resources

Brief situation analysis. No analysis exists at the moment

Proposed methods and procedure:-

- Initialize water quality test with reference to the NWQG
- Summary of the existing status. Any treatment and RWH systems in the district.
- Initialize a pilot project through testing for options in a ....group
- HWTS options, SODIS, ...

Expected:

- Access to safe drinking water

NEPAL

National Strategy on HWTS:

1. Short term (within 2 years)
   a) Review existing HWTS related strategy and operational procedures of all stakeholders
   b) Mainstreaming of HWTS
   c) Develop consistent advocacy & awareness raising, promotional materials and conduct training
   d) Develop and integrate HWTS in the national operational guidelines oh WQ
   e) Facilitate private entrepreneurs in promotion of POU production at local level

f) Action research on technology development & consumer behaviour & national dissemination
g) Short term blanket testing of WQ & diarrhoea prone districts of the country (5 districts)
h) Introduction of HWTSW in schools, tea shops & bazaars

2. Long Term:
   a) Operationalization of national POU guidelines developed in short term
   b) Mandatory implementation of water safety plan (WSE) to ensure the quality of drinking water
   c) Linkage of HWTS strategy with sanitation master plan
   d) Blanket testing of WQ and implementation of HWTS in all 75 districts & periodical updating
   e) Implementation of WQ surveillance system adapted by MOHP with yearly updates

PAKISTAN

Steps required to promote HWTS at national level:

- Developing a national baseline of water quality status so that prioritize the critical parameters
- Awareness raising through community mobilization and behaviour change through comprehensive behaviour change communication plan (educating the communities about the health benefits of HWTS, hygiene message should focus on few key practices based on pre-testing: the less the better, message in positive node and with simple words in local language
- Evaluation of existing HWTS options and scaling up through social marketing with lead role of Govt. In partnership with local and international NGOs
- Standardization of HWTS options
- Strategic planning and integration among ministries, dept and WASH cluster at national, Provincial and Dist level during development and emergencies
- Integration of HWTS into provincial WASH strategies and action plan
- Advocacy for enabling environment for policy and implementation
- Lead role of Govt. Depts
- Establishment of monitoring and evaluation mechanism
- Stakeholders: Fed govt, MOE< MOH, PC Provincial govt, P&D, HUD & PHED, LG & CD, NGOs and WHO, UNICEF

SRI LANKA

Strategy

1. Short term:
   a) Preparation – HWT data collecting (including emergency, performance evaluation, available actions, workshop (national level) MOH/MOW/MOE, CBO, LA NGO (criteria for selection of HWT)

b) Implementation – RWS units – Districts (22). Decision making (MOH, eng(WB), LA, CBO, NGO (PHD, Sociologist), Hygiene education
c) Monitoring and evaluation – PHI (MOH) – reporting. Sociologist (NW & DB). Planning officer (LA). Community leader
d) Review

2. Long term:
   a) Water safety plan
   b) Sanitation
   c) Hygiene education
   d) Water quality surveillance

Goal: Safe water at HHL