

DRAFT

Meeting Notes of the

**THE THIRD ANNUAL MEETING OF THE
INTERNATIONAL NETWORK TO PROMOTE HOUSEHOLD
WATER TREATMENT AND SAFE STORAGE**

and

**2005 INTERNATIONAL SYMPOSIUM ON HOUSEHOLD WATER
MANAGEMENT**

Bangkok, Thailand

30 May - 2 June 2005

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1. Summary

The **3rd Annual Meeting of the International Network to Promote Household Water Treatment and Safe Storage** (the Network) was held 30-31 May 2005, in Bangkok, Thailand. Attended by approximately 120 participants from local and international NGOs, representatives from Ministries of Health, bilateral agencies, academia, large and small companies, and international organizations, the meeting aimed to:

1. to assess Network progress to date and to establish a revised workplan identifying principal objectives and Network activities for the coming year; and
2. to raise the profile of household water treatment and safe storage (HWTS), globally, and in the South Asian region particularly, including building regional capacity through the 1-2 June 2005 International Symposium on Household Water Management.

The meeting built on the groundwork laid by a preliminary meeting in Geneva, the 1st Annual Meeting in Washington DC, the 2nd Annual Meeting in Nairobi, Kenya, the on-going contributions of Network collaborating organizations, and by the work of participants in their individual capacities.

It was felt that the Network had made progress establishing a global presence, and drawing increased attention to water management at point-of-use. Examples of Network achievements over the last year include:

- expansion of the Network from 20 to more than 70 participating institutions, many from developing countries;
- establishment of a dedicated website on the WHO domain that has attracted over 200,000 hits (www.who.int/household_water);
- inclusion of HWTS and the Network in influential reports like the WHO/UNICEF Joint Monitoring Programme 2005 report, and the MDG Task Force Reports;
- collection of implementation survey data and completion of initial global mapping of HWTS activities;
- establishment of research agenda; and
- the accomplishments of Network collaborating organizations working in their own capacity, for example, in scaling-up implementation and training activities, in engaging in new partnerships, in HWTS advocacy success, and in winning awards for particular technologies.

While there was a feeling of accomplishment, it was recognized that the Network was at a critical juncture, with the emphasis having changed from establishing and building the Network, to one of more effectively supporting scaling-up implementation. With this in mind, Network participants engaged in vigorous, open and frank discussion.

Attended by twice the expected number of participants, it was nevertheless decided to maintain a workshop style, participatory meeting. In order to do this, breakout sessions were divided into sub-breakout groups in the hopes of giving all participants an opportunity to discuss HWTS topics related to advocacy, communication, implementation, and research. These sessions, moderated by working group chairs, centred on assessing progress achieved since Nairobi and identifying future directions and goals.

Over the course of the meeting it became clear that there were several key areas where working group activities overlapped and were mutually supportive. Priorities for the coming year included developing resources and tools to support implementers, such as an on-line clearinghouse of information, fact sheets, and more specifically, a finalization of a document characterizing the costs and benefits of various point-of-use treatment approaches, establishment of a framework to better understand behavioural change and social factors, continuing work on establishing protocols to verify technologies (led by WHO), development of inexpensive tools to assess water quality, and developing and sharing better methods of promoting HWTS to a wider audience.

The Annual Network meeting was immediately followed by a two-day **2005 International Symposium on Household Water Management**. This technical workshop brought together a wide range of presentations on all aspects of HWTS, focusing on field research in developing countries and the impact of implementation activities. This segment built on the success of the 16-17 June 2004 CDC/CARE/PSI/Emory University/Kenya Ministry of Health/Nursing Council of Kenya International Symposium: Household Technologies for Safe Water.

While only a short summary of the Symposium will be presented in this report, presentations are available for download at:

http://www.who.int/household_water/bangkok2005_presentations/

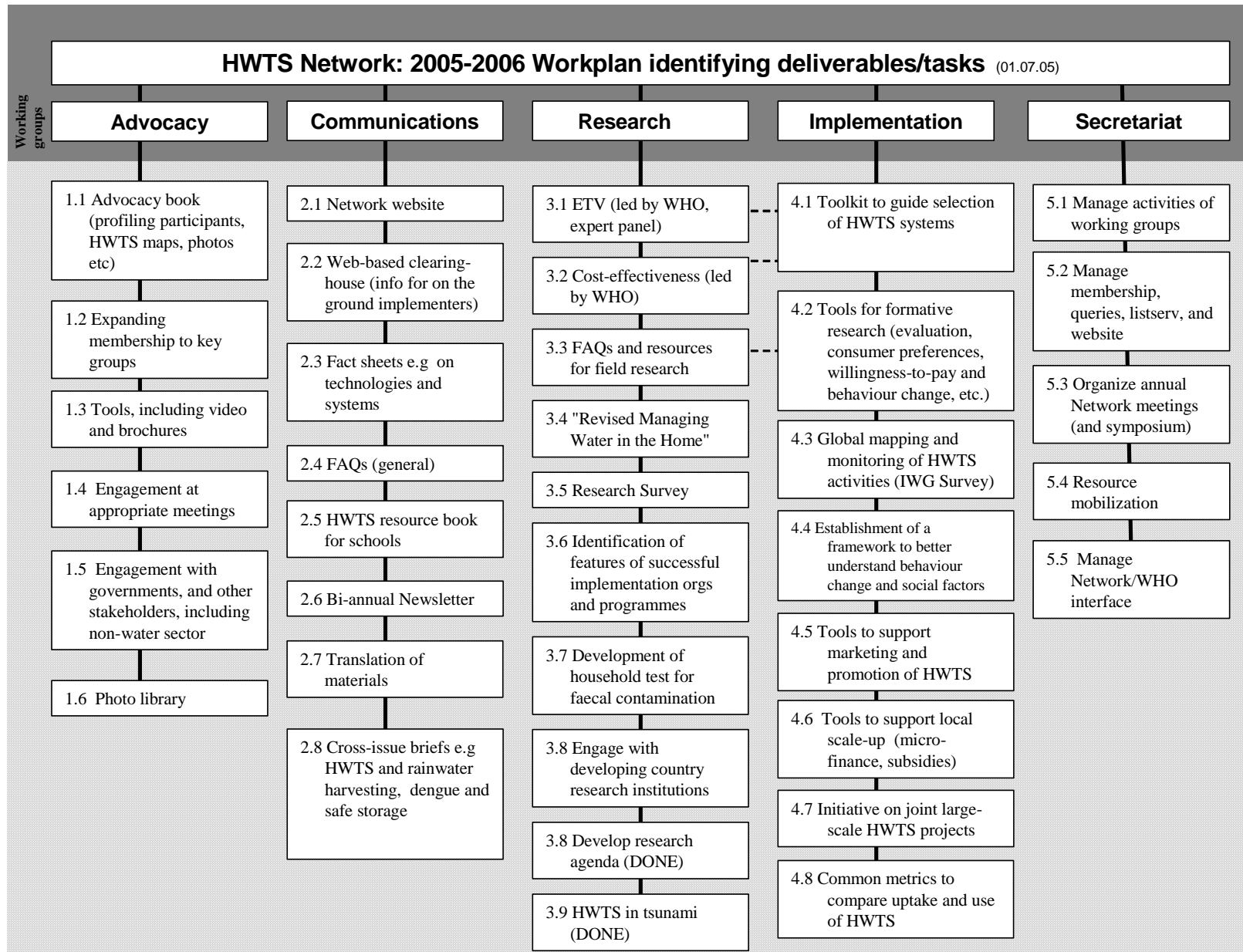
It was agreed that the back-to-back meeting of the Network and technical symposium in Bangkok made significant progress toward the goals of promoting household water treatment and safe storage and facilitating collaboration between members.

It was also noted that if future back-to-back meetings were planned, the Network meeting should come after the Symposium and be informed by its results.

The meeting adjourned without having named a future venue or date for the next Network meeting, although there was agreement that efforts should be made to find a Latin American venue.

A one-page summary workplan, outlining a synthesis of agreed tasks and deliverables follows:

2. Network Workplan 2005-2006



3. Opening Session

Welcome

Mr Bruce Gordon of the Network Secretariat welcomed attendees. Mr Gordon expressed regrets from Dr Jamie Bartram, Coordinator, WHO Water, Sanitation and Health Programme who was unable to attend the meeting. Mr Gordon informed the attendees that, despite the increase in attendance from last year, the meeting was still meant to be informal and interactive.

Introductory Remarks

Mr Han Heijnen of WHO's South-East Asia Regional Office (SEARO) acknowledged that improvement has been made in provision of safe water and sanitation but stressed that many are still unserved. He proposed that the priority of the Network should be to provide access to safe water and water security. He also made a plea for inclusion of rainwater harvesting as a priority in the Network agenda, including an investigation of the quality of rainwater that is collected and stored. Mr Heijnen applauded the growing attention given to HWTS by WHO and recognition that is a crucial component in the global quest for safe water for all. However, he asked the participants to consider the possible safeguards that must be put in place to ensure that HWTS provides a safe alternative. He emphasized the importance of not only technical performance characteristics, but actual use of the technologies in the home. Mr Heijnen noted the importance of HWTS ethics and stated that we must provide the user with the "Certainty or near-certainty of the technology working all the time." Mr Heijnen stressed the importance of more NGO involvement as key participants in implementing such technologies at the local level.

Having previewed the meeting and symposium material, Mr Heijnen characterized some of the current research findings as "very interesting and very disturbing", citing specifically the upcoming session on the role of HWTS in emergencies, which would reveal unique challenges for implementers of HWTS. Finally, Mr Heijnen expressed his own encouragement at the enthusiasm among Network members for the goals of the Network. He entreated attendees not to lose that enthusiasm and to channel their individual energies toward their individual specialties, whether in the realm of science, government, or NGOs.

Mr Chatphan Karnkeaw of the Department of Health, Thailand, congratulated the Network for achieving such a strong attendance and enabling so many organizations to collaborate and achieve the common goals of the Network. Mr Karnkeaw reminded the attendees that safe water is a critical need in Thailand and stressed that it is a human right. He noted that Thailand has made significant gains in recent years, approaching universal coverage, and has developed a system to enable communities to monitor water quality themselves. He cited the lack of waterborne disease in the aftermath of the December 2004 tsunami as evidence of the effectiveness of the country's water and hygiene programs. Finally, Mr Karnkeaw said that Thailand was happy to have the opportunity to share their experience with the Network.

Official Opening

Professor Mario Tabucanon, acting President of AIT, congratulated the Network for selecting AIT as host. He informed the attendees that AIT was invited by the Sri Lankan and Maldives governments to help those nations respond in the aftermath of the tsunami and that their response included distribution of HWTS technologies. Mr Tabucanon encouraged Network members to meet with faculty in the Public Health Engineering,

Environmental Engineering and Urban Water and Sanitation programs at AIT. On behalf of WHO, the Thailand Ministry of Public Health and AIT, Professor Tabucanon officially opened the meeting.

Confirmation of Officers

Mr Han Heijnen of WHO-SEARO was confirmed as meeting Chair in the absence of other nominees or volunteers. Mr Joe Brown and Mr Mark Elliott of the University of North Carolina were confirmed in the role of meeting Rapporteurs.

4. Overview of the Meeting and Methods of Work

Assuming the Chair, Mr Heijnen presented a meeting overview, agenda and method of work. He noted that the morning session of 30 May would be concluded with four areas of concern, corresponding to the Working Groups: Research, Implementation, Advocacy and Communication. The issues of the morning plenary session would be taken up by the individual working groups. The Research and Implementation Working Groups would be broken up into sub-breakout groups because of the anticipated number of participants.

5. Presentation: "The Network"

Mr Gordon emphasized the importance of the Network by stressing the vast number of potential beneficiaries: billions of people without access to safe drinking water. He presented a brief background of the Network, its purpose and an update of the past year's activities. He stated that the Network is at a turning point having successfully accomplished Phase I. Phase II is scaling up HWTS. Currently there are 70 collaborating institutions in over 50 countries, roughly three times as many organizations as in February 2003. Yet, he noted that there is still a lack of awareness of HWTS and the Network must speak with a common voice for advocacy. He added that the key task of this Network is to promote.

Mr Gordon listed the guiding principles of the Network, noting it: (i) will use evidence-based approaches (ii) will actively seek to understand target communities and involve local people (iii) will recognize the role of women in household management of water (iv) will operate in a balanced manner in terms of regions, technologies, and types of member organizations involved (v) will maintain an agile structure and administration. He added that because the secretariat is so "lean", Network members would have to take a lead in taking on agreed activities. He highlighted the recent decision of WHO to allow the Network to collaborate with, and receive support from, approved private sector companies, describing this as a notable achievement for an initiative within the WHO.

Mr Gordon suggested participants contribute to four outcomes: (i) Increase the Network's collective momentum (ii) Engage with new stakeholders (iii) Review deliverables and on-going work (iv) Finalize plans for Working Groups for next year in terms that are: action-oriented (i.e., define concrete actions to reach network objectives), realistic (i.e., priorities), and roles- and responsibilities-oriented.

Following his presentation, Mr Gordon introduced new members, emphasizing the unique importance of each constituent group. He welcomed, in particular, the recent involvement of South Asia governments in the Network.

7. Updates on HWTS Technologies

Mr Gordon yielded the floor to Mr Heijnen, who encouraged core members to meet others at the meeting and informed the attendees that he will try to act in a directive role during the meeting. Mr Heijnen introduced Dr Rob Quick, of CDC, to give the first of six brief updates on the progress of technologies or aspects of HWTS.

Safe Water System

Dr Quick presented a talk entitled "Safe Water System Update", a summary of the recent work conducted using the model and framework of the CDC's Safe Water System (SWS). He introduced listeners to the three main components of the SWS: treatment of water with sodium hypochlorite solution, safe storage, and behavior change. He noted that CDC has established Safe Water System projects in 21 countries and Population Services International (PSI) is their partner for fifteen of these. Other partners include USAID, CARE, P&G, Rotary, Johns Hopkins, ENPHO, and AED among others. Over 4.5 million bottles of sodium hypochlorite were sold in the fifteen PSI countries in 2004.

He noted that the response of Network members to the tsunami and other disasters brought tremendous positive publicity to the role of HWTS in disaster relief. CDC took on emergency relief efforts in West Timor and tsunami-affected areas, including Indonesia, Myanmar and India. Dr Quick added that the SWS has also worked with the Society for Women and Aids in Kenya (SWAK) to develop micro-entrepreneurship programs and rural distribution networks. Innovations in the past year, both in Kenya and elsewhere, include incorporation of SWS into school curricula and tuberculosis programs, as well as private sector implementation combined with community-based organization mobilization. CDC has also undertaken analyses of program costs, which have been submitted for publication.

Solar Disinfection

Mr Martin Wegelin of SANDEC was invited to take the floor and speak on solar disinfection (SODIS). Before beginning to discuss SODIS, he encouraged Network members to commit to "Actions after Declarations". He then summarized key news from SANDEC during the past year, including participation in the Global WASH Forum in Dakar, Senegal, and the fact that SODIS won the Special Award during the Energy Globe Awards 2004.

He said that SODIS is been used formally in twenty countries by one million people with further informal use. There have been signs recently that indicate the sustainability of SODIS in Thai villages and infectivity studies in mice suggests that SODIS inactivates *Giardia* and *Cryptosporidium* species.

Ceramic filtration

Mr Thomas Clasen of the London School of Hygiene and Tropical Medicine (LHSTM) took the floor to discuss new developments in ceramic filtration. He summarized the major types of ceramic filters being used currently and informed the attendees of fourteen field trials and pilots underway. He then presented microbial efficiency data from Cambodia. One key finding from Cambodia was that only 15% of filtered water samples qualified under WHO guidelines as "Low Risk" (<10 FC/100 mL).

Mr Clasen then presented microbial efficiency and diarrhoeal prevalence data collected during field trials conducted in Bolivia. The data revealed near total reduction of fecal coliforms in filtered water and mean reductions in diarrhoea were 42% and 64% in two

studies. However, he pointed out that the inconsistency of results between and within studies is important. Sometimes the positive effects of the filters are localized to one area. Consistency and quality of production can also be a problem with locally produced ceramic filters, but the ability to produce filters locally can be an advantage if done properly.

Biosand filtration

Ms Camille Dow Baker of CAWST discussed history of the biosand filter (BSF) and noted that its design is based on a household scale modification of traditional slow sand filtration. She said that the BSF uses a combination of microbial and mechanical processes and that the biolayer must be kept alive by provision of dissolved oxygen and nutrients.

She noted that the filters have been able to spread to over 33 countries with little capital investment. She suggested that between 300,000 and 400,000 people are being impacted worldwide. Production costs for concrete filters are usually \$15-30 but this does not include training costs. The concrete version of the filter is robust but heavy. Therefore, transportation is a disadvantage because of its weight. Key advantages include high user satisfaction, aesthetic properties of the water and the belief of users that they feel better after adopting the filters. Finally, Ms Dow Baker stated that the BSF is at the "breaking point". Many current projects and pilots are underway with governments involved.

Combined flocculation/disinfection

Following Ms Dow Baker, Dr Greg Allgood of P&G spoke on combined flocculation/disinfection technologies, focusing on P&G's PUR water treatment product. He recounted the results of controlled lab studies revealing that PUR is able to achieve: 8-log reduction of pathogenic bacteria, 4-log reduction of viruses and 3.3-log reduction of parasitic cysts. He added that PUR also works to bind arsenic.

Dr Allgood updated the attendees on current and recent PUR projects, including: (i) the initiation of social marketing programs in Uganda and Pakistan (ii) the expansion of PUR work nationwide in Haiti in cooperation with the UK Department for International Development (DFID) (iii) the completion of six health intervention trials. He reminded Network members that P&G is continuing to combine HWTS with handwashing and noted that Project HOPE has found that handwashing reduces not only infant diarrhoea but also respiratory infection.

Dr Allgood stated that advocacy to bring a general awareness to HWTS will aid all the technologies. He presented an example of how P&G has contributed significantly to HWTS awareness – U.S. Senator Bill Frist has proposed HWTS legislation in the US Senate after visiting tsunami affected areas and seeing the PUR product in action. Finally, Dr Allgood mentioned that P&G has won two water awards recently, including the prestigious Stockholm Institute Water Prize.

Behaviour change

Dr Maria Elena Figueroa of Johns Hopkins University (JHU) spoke on behavior change with a talk entitled "Household water treatment behavior: a review of findings". She has been working on a study of behavior change and attempting to develop a model to explain sustained use of HWTS. Her study analyzed 43 studies published from 1990-2001, along with two classic studies. Most studies conclude that there is a "need to learn

more about cultural factors controlling behavior change" and that "knowledge of watery-diarrhoea is not critical to successful behavior change". She noted that household perceptions of health benefits have proven to be more important than lab results but there is generally no perceived need for safe water except in epidemic or cholera conditions. Aesthetic factors also have an important role in encouraging sustained use and people tend to trust boiling. Dr Figueroa listed some other key factors: time constraints, values and beliefs of family members/elders, and local beliefs that certain water sources fundamentally can or cannot be treated.

She stated that the current model is testable but not yet final and that there is a need for greater understanding before testing and large-scale interventions are needed to test these models, not just pilot scale projects. Finally, Dr Figueroa proposed that the relationship between safe water, other hygiene behaviors and nutrition must be investigated.

Mr Heijnen reassumed the floor and warned Network members and guests about "missing the plank completely in terms of the consumer." He then opened the floor to questions. The following points were made:

- The Network must take care to address not only technologies, and correct use of technologies, but must also address sanitation and hygiene to prevent recontamination of household drinking water;
- "Software" such as education, training, and programmatic support to promote behaviour change may be 90% of the issue in HWTS;
- More should be invested in understanding behavior change - the focus must be on public health impact and reducing diarrhoeal mortality/morbidity and the "message must reach peoples' hearts." Stakeholders need to invest in large-scale interventions and be aggressive;
- In regards to the importance of behavior change - microbiologists took the lead in the formation of the Network and the role of epidemiologists has increased. Perhaps social scientists have the next major role as part of the natural evolution of HWTS;
- Capacity building is the essential part of the implementation process;
- There may be a need to more precisely define diarrhoea – e.g. according to whether its watery or bloody/dysentery (many mothers do not see watery diarrhoea as a problem and the two types have vastly different rates of morbidity associated with them). In addition indigenous people have definitions of diarrhoea that can be problematic.
- Encouraging use of oral rehydration salts can reduce greatly the mortality associated with cholera and dysentery.

8. Working Group Introductory Presentations

Communications

Dr Greg Allgood of P&G was invited to describe briefly the role of the Communication Working Group in the Network. He praised the Network website as a huge success with over 200,000 hits since its launch in October 2004. It now has a prominent place in the greater WHO website.

He noted the excellent work done by Mr Jeffrey Sloan of the Chlorine Chemistry Council on the second Network newsletter. He stressed the Network's engagement at a number

of significant meetings including, most recently the April 2005 “Partnerships through water to health” event at CSD-13 in New York; and the International Council of Nurses Quadrennial Conference in Taipei. He emphasized the importance of the inclusion of HWTS in the Dakar Statement arising from the December 2004 WASH Forum in Senegal; and the high profile of HWTS at the September 2004 IWA World Water Congress in Marrakech. He cited others including the CSIS World Water Forum in Washington DC; the Aspen Institute Global Water Meeting in Aspen, CO; the AGUASAN Workshop in Gersau, Switzerland; regional SODIS workshops in numerous places; presentations to members of over 60 Rotary clubs; meetings of the Global Vinyl Council; the World Chlorine Council General Assembly and others. Other high profile meetings include recent P&G briefings of the Gates Foundation and Clinton Foundation. Dr Allgood went on to highlight the increasing number of HWTS-related publications, both in academic journals, in reports, and documents posted on-line.

Finally, Dr Allgood called for Network members to provide links from their websites to the Network website.

Advocacy

Mr Bruce Gordon subsequently updated the attendees on the activities and role of the Advocacy Working Group. Mr Gordon stated that advocacy is of central importance to the Network and that advocacy and communication are the key aspects of promotion. He proposed that promotion is the most important function of the Network as a collective entity.

Mr Gordon stressed that advocacy is not only the function of the Secretariat, but that it is the responsibility of everyone in the Network. He suggested that successful advocacy required a consistent message: that HWTS can be immediately deployed; that is effective, that it is cheap, and that it empowers families to take charge of their own health. He went on to say that advocacy happens whenever Network members talk about their work. He noted that there was a lot of progress made this past year within WHO and that opportunities were always taken to promote HWTS (for example within the World Health Day message).

The Network has been included in influential reports such as WHO and UNICEF’s 2005 Joint Monitoring Program (JMP) report, released 2 June 2005. It is an important report for establishing policy and could impact the way policy makers come to regard HWTS approaches. Network’s success. Just as importantly, the UN Millennium project has mentioned HWTS as a means of reaching the Millennium Development Goals (MDGs).

He noted that broad challenges for the Network include finding ways to deploy its message and focusing on expanding membership, especially to the South and to the health sector.

Among a number of future priorities, Mr Gordon proposed that Network members consider putting a video together as a Network. However, he suggested that the most important deliverable from the advocacy point of view is a potential Advocacy Book. This book could be the key deliverable from the advocacy side of the Network. The following components might be included: (i) Profile of organizations, including HWTS interest, expertise and contributions (ii) Global Maps of HWTS activities (iii) Maps of Network collaborating organizations (iv) Success stories (v) Profile of organizations, including HWTS interest, expertise and contributions (vi) Strategic plan and workplans and (vii)

Questions and answers.

The following points were raised in a brief question and answer session followed the Communication and Advocacy Working Group updates:

- Continued efforts need to be made linking HWTS and the MDGs - "Is there willingness to link-up with UN Millennium Development effort?" In this respect progress has been made: household surveys, drawn on by the JMP, will include questions on HWTS and these results will be available by mid-2006. This could open the door to have populations applying HWTS correctly to be considered among those having access to safe drinking water.
- Household water management is a marginalized part of water/sanitation community. We need to make our voices heard by major players, including reaching more senior and influential sanitary engineers about health benefits of improving water in the home.
- Long-term advocacy efforts are key, especially in terms of technologies, and behaviour change. "Changes in behaviors and changes in engineers can take a generation."
- "Almost 50% of poor residents depend on groundwater. There is a need for good, affordable technologies for treating brackish groundwater." Solar distillation units are a simple solution. Ion exchange resins are high cost, currently. Perhaps natural ion exchange resins, like zeolites, may be able to treat brackish waters but there has been little research on it. Mr Heijnen pointed out that new solutions to brackish groundwater are good examples of the need for good technology.

Research

Professor Mark Sobsey of the University of North Carolina presented a talk entitled "Research Work Group: Where are we now? Where are we going? How will we get there?" Prof. Sobsey mentioned six key deliverables and activities, either current or recently completed: (i) "WHO Guidelines for Drinking-water Quality", 3rd ed., 2004: HWTS included/integrated (ii) "Managing Water in the Home" (2002): revised and becoming a book. Two new sections: Behavior (by Dr Figueroa) and Cost-effectiveness (by Mr Clasen, et al.) are being incorporated into the previous document. (iii) Cost-effectiveness analysis: a draft document (iv) Environmental technology verification (ETV) document: formal guidance on HWTS technology performance verification (v) Assessment of HWTS in response to the South Asia tsunami: report and analysis (vi) A research questionnaire: drafted and available soon. Dr Sobsey also called for new data on HWTS technologies that could be incorporated into the revised version of "Managing Water in the Home".

Dr Sobsey proposed that many Network members will have to become familiar with new concepts, like risk assessment and health-based targets, if the Network wants to keep up with the methods that are used to assess water quality interventions in the regulatory and academic world. He added that an ETV document that incorporates these concepts will be available in draft form, hopefully by the end of the year.

Dr Sobsey's final slide was entitled "Where are we going?" and "How will we get there?" He proposed that Network members could best contribute to the meeting if they would: (i) assess/share their successes (and failures) (ii) share their plans for the year ahead (iii) consider how you/your organization can contribute to the Network and its members

(iv) ask how the Network and its members can help you (v) Communicate, Facilitate, Link, Leverage, Cooperate and Collaborate.

Implementation

Following Dr Sobsey's presentation, Ms. Susan Murcott of MIT spoke representing the Implementation Working Group. Her presentation was entitled "Year 1 - Progress Report of the 'Network' Implementation Working Group". She recounted briefly the action plan established in Nairobi last year and noted the progress achieved toward the action plan goals as evidence of the group's success. She mentioned that the Implementation Organization survey (19 pages long and 1-2 hours to complete) is established and available online. A shortened version, the Network Implementation Working Group Survey (4 pages, 15-30 minutes to complete), has been finalized and is available online. It is meant as an information-gathering tool only, so that the Network can get a better understanding of what HWTS programs and technologies are being implemented where.

She raised the Implementation, Monitoring and Evaluation Targets that have been established recently. They are: Health Outcome, Water Quality, Technology Performance, Behavior/Use and Financial. She stressed there is a need for all members of the Network to be on the same page. She proposed new metrics such as the Rate of Adoption (ROA), Rate of Sustained Use (ROSU), and Market Penetration and Acceptance Level. ROA was defined as the fraction of people who are using their HWTS one-month after receiving it. ROSU was defined as the fraction of people who are using their HWTS one-year after receiving it. Market Penetration was also defined. It is the number of units sold divided by the population of the country in question for one-time HWTS purchases. For recurrent HWTS purchase, Market Penetration is the units sold divided by the number of units necessary for one year of safe water, divided by the population of the country in question. The Acceptance Level was defined as the proportion of households that adopted the HWTS technology or practice divided by the number of households reached or trained. Finally, Ms Murcott noted that "We need to be able to compare apples to apples in implementation and sustainability" so common metrics need to be used to define success.

The following points were raised in the question and answer period following the Research and Implementation Working Group updates:

- "Are we under representing the amount of HWTS out there?" Has there been any effort to monitor the levels of HWTS that people are already using (not what is being implemented by Network people)? It was pointed out in response that household surveys (DHS and MICS) will soon include questions about HWTS, providing a means of information collection outside of standard Network channels.
- Most HWTS technologies are aimed at the middle class, not the poor, because the middle class have more money. The commercial sector is providing HWTS on a for profit basis.
- "We need to hear about technologies, projects and initiatives that did not work, so that Network members will not repeat the mistakes of others."

"The sandwich supply approach"

Mr Martin Wegelin of SANDEC was invited to make a brief presentation before lunch. He stated that the Network's objective should be to provide households with clean drinking water and that the strategy is to meet the demand of the people. He proposed that the

means by which the Network accomplishes this is to: develop supply chains, cover people's demand, assess the market, improve the product. Network members and implementation organizations must communicate the options, let people select their option, then supply, monitor and improve the product.

Mr Wegelin described his proposal as the "Sandwich Approach." He emphasized that the main providers of HWTS methods (such as for chlorination, flocculation/chlorination, solar disinfection, filtration) had so far promoted and disseminated their water treatment methods independently. He pointed out that this was a supply driven approach. He proposed to change this approach to a demand driven strategy in which the target population is included in the selection of the water treatment they prefer, indicating this could be taken up in a joint Latin American initiative. During the meeting, Mr Wegelin discussed this informally, and received wide support. Details of this initiative are provided in the Annex.

Following Mr Wegelin's presentation, the meeting broke for lunch. For the afternoon, attended a breakout session of their choice.

Breakout group sessions:

- Breakout Group 1 - Communication & Advocacy
- Breakout Group 2 - Research
- Breakout Group 3 – Implementation

The conclusions and recommendations of the Breakout Group sessions were summarized during presentations the morning of 31 May.

9. Plenary Session – Breakout Groups Reports

The second day of the Network meeting began with a brief summary by the chair on activities from the previous day and introduction of the day's programme. Rapporteurs from each working group were invited to present the results of breakout group sessions from the previous afternoon.

1. Communication and advocacy working group

Dr Greg Allgood of P&G reported on the progress made by the communication and advocacy working group the previous day. The group's recommended a number of measures listed below.

- The creation of a centralised (i.e. online) source of information for implementers, including information on specific technologies and tools for use in implementation of HWTS technology.
- Expansion outward. The working group concluded that working together with other, larger organisations would help raise the profile of the Network in the global community. Links should be established with large, visible NGOs, UN organisations, and other groups. The purpose of establishing these links would be to raise the profile of the Network but also to integrate HWTS initiatives into other highly visible programmes, such as the Millennium Development Goals. Links forged with other, perhaps non-water programmes could also be established, due to the central nature of household water to family and community health. Nutrition and HIV/AIDS programmes could have HWTS elements where the Network could get involved. The working group concluded that position papers for the Network

could be drafted to facilitate integration with other groups and initiatives where HWTS could play a role. Other organisations could also be invited to Network meetings.

- The Network should engage in highly visible advocacy campaigns, including a video on Network activities and a glossy book highlighting Network members and promoting HWTS initiatives.
- The working group suggested recruiting local or international celebrities to play a role in future advocacy.

Discussion was opened to the floor by the chair following the communication and advocacy work group's presentation. It was agreed that more visibility of the Network is needed. Drs Sobsey and Figueroa agreed that any information accompanying the recommendation of technologies specifically via a Network website should be linked to the WHO Guidelines for Drinking Water Quality as articulated by the forthcoming Environmental Technology Verification (ETV) document in preparation. Several suggestions were made that more links need to be forged with medical professionals, as these people have established respect in many local communities. In this regard, a primary activity should be the education of doctors and nurses on the impact of household water on health because water and sanitation issues often have a lower profile in the medical community than they may deserve. Publishing papers in medical journals and talking to doctors about the role of HWTS were suggested means to inform doctors.

2. Implementation working group

The implementation breakout session working group was divided into two sub-groups because of its large size. All constituent groups were present in this session, with significant representation from NGOs. The first sub-group, moderated by Susan Murcott and Rochelle Rainey, focused on the working group's progress to date and agreeing on specific priority activities that built on prior workplan. The group's second year priorities were given under the following headings:

- Behavior change intermediate variables
- Management of quality assurance, quality control, maintenance, product certification/recognition, and relationships to WHO and other international guidelines
- In-country support for marketing and promotion of HWTS
- Common metrics to compare adoption and use of HWTS
- Leveraging local resources to scale-up
- Advocacy at governmental levels for credibility of HWTS

A sign-up sheet was circulated giving participants an opportunity to contribute to these headings. (These tasks have been reflected in the workplan, presented on page 5, in a consolidated form with other agreed priorities.)

Discussion following the group's presentation focused on strategy and the development of ETV guidelines, as well as the importance of working together on common themes across the Network.

The second sub-group, moderated by Camille Dow Baker, sought first to understand the expectations of participants, then focused on enabling participants (especially those new

to the Network) to identify HWTS implementations areas they felt were priorities and from this recommend potential solutions.

Participants came to learn – so they could improve investments, better communicate with communities and decision makers, find out methods and strategies to change user behaviour, and to learn more, specifically about safe water containers. People also came to share tools and contribute to the development of tools. Participants in this sub-group felt that the major implementation challenges centred on:

1. *Stimulating community demand/ Generating community ownership* – e.g, overcoming the inertia to change; helping communities make the connection between water and health; and convincing communities that the technologies are safe
2. *Funding* – e.g. lack of funding; and mismatch of what funders will fund and what implementers need
3. *Ensuring sustainability of approaches* – e.g. hygiene education and reduction of recurrent expenses
4. *Successful Monitoring and Evaluating* – e.g. who is responsible, and how do you ensure systematic follow up?
5. *Appropriate technical support for HWTS* – e.g. technology solution framework for varied social and economic contexts; technical proof; technical education
6. *Varying educational background of populations* – e.g. illiterate, multiple languages, migratory
7. *Adequate Supporting framework* - from local government, researchers, guidelines

To solve these challenges, participants proposed that implementers should focus less on “pushing” a particular technology, but more on planning an implementation strategy that responded to the conditions and needs of a community. It was suggested that there should be a significant focus on education and capacity building, specifically on making the link between water hygiene and health care, including integrating water safety and health into primary school curricula, and focusing on educating women. Implementers were also advised to develop a clear framework for marketing, including taking advantage of mass marketing techniques like radio and television.

The sub-group stressed the need to encourage and support local manufacture and supply of effective HWTS technologies, by training local entrepreneurs. Indeed, much emphasis was placed on how to support implementation with minimal external funding. In this regard, implementers should consider developing micro-finance strategies with communities, as well integrating HWTS projects into other programs. Nonetheless, mobilizing resources by educating funders, and through proper advocacy was also seen as necessary.

In conclusion the group recommended the following as Network implementation priorities:

1. Tools & Resources
 - Best Practices in Different Contexts
 - Forum for non-partisan exchange of ideas, questions
 - Education Materials
 - Pictorial materials that could be adapted to different situations
 - Mass Marketing Tools

- Framework for choosing most appropriate HWT systems

2. Advocacy

- With governments
 - To move HWT from the margins to the mainstream
 - To make it part of the school curriculum
 - To create synergy among Ministries of Health, Education & W&S
- With Funders
 - To better align priorities and approaches

3. Guidance

- For project evaluation criteria
- For quality control of product manufacture

3. Research working group

The report from Subgroup A (“Hardware”) was given by Mark Sobsey, who stressed the synergy between groups and mentioned the goal of creating an ETV document to create a basis for comparing technologies. The group discusses the basics of this important deliverable. Priority research needs for the group were identified as:

- Research to support field practice
- "Hardware" research needs
- "Software" research needs
- Data collection and analysis to inform practice
- Development of new tools to support practice and share knowledge

Suggested activities for Subgroup A, presented by Mark Sobsey, included:

- A survey of existing HWTS technologies already in use in various countries, including those independent of the Network, would be helpful. Data on performance for other technologies should be gathered, where they exist.
- A simple, inexpensive test for *E. coli* intended for home use in developing countries is needed to inform users.
- How HWTS technologies play a role in meeting the MDG#7 target #10 needs to be articulated by the Network.
- A working definition of "safe water" would be useful.
- Graded standards may be needed for HWTS technologies, establishing categories of performance. The Network ETV document will be key to this work.

Suggested activities for subgroup B (Software), presented by William Duke, included developing:

- Information that described features of successful organisations in HWTS implementation. Why are some organisations doing better with implementation? Identify strengths.
- Web-based resources to get questions on HWTS answered; electronic conferencing and collaboration
- FAQ on HWTS as a network resource (website)
- Capability to direct people to available tools and resources for HWTS implementation (questionnaires and other tools): internet-based
- Possibility of an online pre-conference for the research group

The discussion following Subgroup B's presentation was focused on the value of doing a comparative study or series of studies to establish the roles of each HWTS technology.

Susan Murcott suggested, with regards to the issue of ETV, factors other than strictly microbiological should be included in any "graded" approach to technology selection, with a view toward sustainability. Economic and other factors come to bear that can influence technology selection.

There was widespread agreement that overlapping tasks, though potentially in separate working groups as they are now defined, should be combined into common theme areas when deliverables are to be assigned. Cooperation where common ground exists can benefit the Network as a whole.

It was also agreed at this point that Network materials should be in other languages, at the very minimum Spanish and French in addition to English.

10. Plenary Session – Panel Discussion on HWTS in Emergencies

Moderated by Dr Teófilo Monteiro of PAHO, the discussion began with the presentation by Tom Clasen of the research that formed the basis for *The Drinking Water Response to the Indian Ocean Tsunami, Including the Role of Household Water Treatment* (Clasen and Smith 2005; WHO/SDE/WSH/05.04). The presentation outlined the role of HWTS technologies in the relief effort in response to the tsunami of 26 December 2004. Conclusions were that household-based approaches did not play a significant role in the initial phases of the tsunami response with the possible exception of boiling. This was not due to their lack of availability – millions of units of these products were shipped to the region. Rather, responders often found that household water treatment was not suitable during the immediate aftermath of the disaster due to (i) the need to emphasize water quantity over water quality, (ii) the unique conditions imposed by the tsunami that continued to necessitate the supply of bulk treated water, (iii) the unavailability of human and other resources for the programmatic support to launch household water treatment, (iv) concerns that the introduction of new methods of water treatment would send mixed messages about other practices, and (v) concerns about the sustainability of such methods."

The report concludes with several recommendations, including: "(i) continue to take steps to minimize the risks of waterborne diseases following natural disasters, (ii) develop and disseminate practical solutions for the special circumstances associated with tsunamis, including saline water intrusion, (iii) clarify the conditions under which proven approaches to household water treatment may be useful in emergencies and assess their role in the medium- and long-term response, (iv) improve water quality and surveillance without compromising emphasis on water quantity, (v) take advantage of the enormous resources committed to the tsunami response to make effective and sustainable improvements in water, sanitation and hygiene in the affected areas, and (vi) document experiences from the tsunami response, distil the lessons learned, disseminate the results and develop guidelines to inform future actions." The full text of this document is available at www.who.int/household_water/research/tsunami/. Mr Clasen emphasised that care should be taken to not extrapolate from this experience, since by all accounts the tsunami situation represented exceptional circumstances, and the fact that HWTS technologies did not play a major role should not be taken as

unequivocal evidence of their unsuitability for use in disaster relief situations. The disaster response was indeed a learning experience and care should be taken to find ways of employing these lessons in future. The international profile of the role of HWTS technologies was also raised considerably as part of the response.

Discussion following this presentation was led by Dr Monteiro of PAHO, with the following panellists contributing: Mr Thomas Clasen, LSHTM; Mr Andy Bastable, OXFAM; Mr Eric Fewster, Bushproof; Ms N. Rhada, LEAD; Dr Greg Allgood, P&G; Dr Andrew Trevett, Cranfield University; and Dr Endang Widyastuti, CARE Indonesia.

Summary of panellists' remarks:

Andy Bastable of OXFAM stressed that the perspective of the affected people is important; often disaster situations leave people with few resources and needs that extend far beyond drinking water. In disaster relief, OXFAM classifies affected populations as displaced or *in situ*. For displaced populations, the usual strategy is to provide water immediately with a chlorine residual. For people *in situ*, HWTS may play a greater role. All HWTS technologies are implemented with a view toward sustainability, although some are primarily intended to carry the population through a specific high risk period.

Eric Fewster of Bushproof highlighted how a range of HWTS systems are used by his organization, including dropping chlorine packets out of helicopters in Madagascar during a flooding response effort. Follow up in such situations is of vital importance. Also, aesthetic qualities (clarity, taste) of the treated water are important to consider. Often, more turbid water can be a motivator for treatment. He stressed the importance of water quantity, because without access to sufficient water nearby, HWTS is irrelevant.

Ms Rhada of LEAD outlined the implementation of SODIS (and an accompanying handwashing programme) in tsunami affected areas in Tamil Nadu. LEAD implemented a wellness program in 29 villages, 2 relief camps, and schools, where the water and hygiene situation is very poor. SODIS has taken root in the tsunami-affected coastal areas. 89% of people adopted the SODIS after training, after 8 weeks, 97% were using it. There's a fear that another tsunami could come along, so this is a motivation for continued use. Follow-up is important, and establishment of SODIS projects in coastal areas has great potential. Bottles can be expensive, however, especially considering the number of bottles required in a large-scale implementation: 10 bottles (minimum) per family and 25,000 families amounts to 250,000 bottles, which must be bought if they are not readily available. Ms Rhada stressed the importance of maintaining a support programme for these types of interventions.

Dr Greg Allgood, P&G raised the following points: (i) Even though HWTS may not have played a major role in the tsunami response, substantial numbers of people benefited from interventions. The tsunami was an unprecedented disaster, but elicited an unprecedented response. (ii) HWTS received a great deal of exposure as a result of the tsunami relief effort, which raises the profile of the role of HWTS in disaster relief. (iii) This disaster was unique. While there is the temptation to generalise from the experience we had with this relief effort and the role of HWTS, we should keep in mind that this may not represent other situations. (iv) We should learn from the disaster, in terms of preparedness and HWTS deployment strategy.

(v) We should also strive to define the Network's role in disaster relief. Resources of the Network were and in future can be leveraged to meet the special needs that arise.

Andrew Trevett of Cranfield University highlighted how important it is important to keep in mind that all disasters are unique. There are commonalities, but one shouldn't be looking for a stock solution to apply in every situation. There needs to be a thorough needs assessment, along with assessing local water practices in use on the ground. We should also focus on recontamination issues. Another aspect that we should keep in mind is the responsibility of the relief agencies themselves: whilst many agencies are frequently doing relief work, technologies may get passed on to other agencies who may have little or no experience using the technology. This is a risk, since technologies can get discredited through irresponsible implementation.

Dr Endang Widyastuti of CARE Indonesia stressed that CARE could deploy quickly to ACEH, because the organisation was already working there. After two weeks there were many interventions in place, contributing to a chaotic situation that was confusing to some residents. CARE initially distributed interventions in 884 camps, with subsequent evaluation done by the CDC. CARE is concerned with sustainability issues and tried to work on making the Safe Water System (CDC) a sustainable intervention.

Discussion was opened to the floor following the panellists' remarks. Points made during the discussion were:

- Follow up and active support systems are needed for any HWTS intervention, and this is especially true for disaster situations.
- Capacity building (pre-disaster) can help prepare areas to meet their own needs when an emergency situation occurs.
- Emergency preparedness is key to any response.
- Presenting a range of technologies to populations affected by disaster is probably not possible; so implementers must usually choose which sorts of interventions are likely to be best suited to the situation based on an initial, rapid needs assessment.

11. Plenary Session – Closure

The chair reconvened the plenary and some discussion of deliverable tasks was initiated. A synthesis of agreed Network tasks is presented earlier in this report.

Final remarks included a discussion of next year's Network venue and date. Suggestions for possible meeting places were entertained, and included Quito and Guyana. There was wide agreement on the need to have the meeting in Latin America in the coming year, to raise the profile of HWTS there and to better allow participation by Latin American colleagues. It was agreed that a proposal for a date and venue for the next Network meeting would be proposed by the Secretariat as soon as possible.

12. Short Summary – International Symposium

2005 International Symposium on Household Water Management, 1-2 June 2005

Opened by Terrence Thompson of WHO, the symposium aimed to share the latest available information on household water treatment and safe storage, focusing on two key areas:

1. *field and laboratory studies*, to gain a better understanding of candidate technologies; and
2. different *educational and motivational approaches*, to improve practices introducing HWTS to households and promoting HWTS within households.

The 35 oral presentations, and 12 poster presentations also addressed a number of thematic areas including HWTS and emergencies, consumer perceptions and preferences, including willingness-to-pay, and household chemical removal systems. Technology demonstrations enabled participants to see water treatment devices working first-hand.

Thomas Clasen's keynote presentation, "Interventions to improve water quality for the prevention of diarrhoeal disease: a systematic review," summarized the results of his Cochrane review of household water treatment interventions. The data suggests that interventions at the household level are about twice as effective as those at the source, in some cases reducing diarrhoeal rates by 50% or more. However, much variation has been observed in diarrhoeal reduction rates, possibly related to user compliance. He pointed out the particular need for longer-term studies, blinded trials, and studies of immuno-compromised populations.

Following this, a number of lab and field studies examined the performance, health impacts, and user perceptions associated with a range of filtration approaches. The focus was on different forms of ceramic filters, usually coated with colloidal silver (a bacteriostatic), and the biosand filter. Intervention experiences suggest that there is a high degree of user satisfaction associated with filters as they are frequently straightforward to operate, improve the aesthetics of "dirty" water, and introduce no chemicals that can affect taste. A recent study suggests that addition of an iron oxide to ceramic filters can significantly improve their performance in trapping viruses. An on-going study of the biosand filter indicated that the time required to ripen the key biological slime layer can be significant (i.e. up to 30-40 days), and may vary considerably.

Various solar and chemical disinfection approaches were discussed, including SODIS, liquid dilute sodium hypochlorite (e.g. as used in the CDC Safe Water System), sodium dichloroisocyanurate tablets (e.g. as used in the product Aquatabs), solid calcium hypochlorite, and combined flocculant and disinfectants (e.g. as in the product PUR). It was noted that chlorine-based approaches leave a chemical residual to prevent recontamination of stored water, but like most HWTS systems, require accompanying behavioural change programs. Many of these technologies have been introduced over the last years in efforts to scale-up HWTS (e.g. in 21 countries for the Safe Water System). During the thematic session on emergencies, presenters highlighted the unprecedented product deployment in response to the Indian Ocean tsunami.

Several new technologies were presented, ranging from mature consumer-ready products (like the multi-barrier Pureit filter being marketed in India) to innovative new methods in the testing phase (e.g. use of a silane-coated surfaces to deactivate pathogens).

While it was agreed that technology development was important, it was noted that perhaps the greatest challenges related to the “software” side, for example, identifying successful approaches to motivate use of HWTS. Thus, research examining household perceptions, preferences, and practices was seen as a priority area for research. In this regard, field studies show that important considerations in home treatment are taste and other aesthetic properties of the water, convenience of use, willingness to pay, and cultural attitudes.

Presentations on this theme suggested that “positive” attitudes and ideas were better predictors of whether people were likely to consistently treat water than were negative attitudes. For example, educational and promotional messages should target positive ideas, such as clarity, taste, good health, affordability, and ease of use. Evidence also suggest that many householders would be willing to pay for home treatment at an acceptable price (e.g. less than US\$ 10 for water filters in Southern Africa). Payment by installments may be one method of enabling the poor to deal with the relatively high up-front costs of certain technologies.

Participants noted that there was relatively little reported on interventions to improve water storage in the home, and recommended that this given a greater prominence in future symposiums.

All presentations that were made publicly available by speakers, are available for download at: http://www.who.int/household_water/bangkok2005_presentations/.

Annex 1 – Network Meeting Agenda

3rd ANNUAL MEETING OF THE INTERNATIONAL NETWORK TO PROMOTE HOUSEHOLD WATER TREATMENT AND SAFE STORAGE

30 – 31 May 2005, Bangkok, Thailand
Asian Institute of Technology (AIT)

AIT Conference Centre (AIT CC) Main Auditorium

Monday, 30 May 2005

Opening plenary session

- 09h00-9h15** Welcoming remarks
- *Mr Han Heijnen, WHO-SEARO*
 - *Mr Chatpan Karnkeaw, Director, Bureau of Environmental Health Department of Health, Thailand*
 - *Professor Mario T. Tabucanon, Acting President, Asian Institute of Technology*
- 09h15-9h30** Confirmation of Officers
- *Chair: Mr Han Heijnen, WHO-SEARO*
 - *Rapporteurs: Mr Joe Brown and Mr Mark Elliot, University of North Carolina*
- 09h30-09h45** Overview of the meeting and agreement on the agenda
- *Chair*
- 09h45-10h00** The Network 2004-2005
- *Mr Bruce Gordon, Network Secretariat*
- 10h00-10h15** Introduction of new members
- *Mr Bruce Gordon, Network Secretariat*
- 10h15-10h45** Update: recent developments in household treatment and safe storage
- *Dr Rob Quick, CDC (Safe Water System)*
 - *Mr Martin Wegelin, SANDEC (Solar disinfection)*
 - *Mr Thomas Clasen, LSHTM (Ceramic filters)*
 - *Ms Camille Dow-Baker, CAWST, (Biosand filters)*
 - *Dr Greg Allgood, P&G (Combined flocculation/disinfection)*
 - *Dr Maria Elena Figueroa, John Hopkins University (Behaviour change)*
- 10h45-11h15** Tea Break

11h15-11h30 Discussion on recent developments

11h30-12h30 Working Groups present

- Communication: *Dr Greg Allgood, Procter and Gamble*
- Advocacy: *Mr Bruce Gordon, Network Secretariat*
- Research: *Professor Mark Sobesy, University of North Carolina*
- Implementation: *Ms Susan Murcott, MIT*

12h30-14h00 Lunch

Breakout group sessions

14h00-15h30 Move into breakout sessions (See attached descriptions)

- Breakout Group 1 - Communication & Advocacy
- Breakout Group 2 - Research
- Breakout Group 3 - Implementation

15h30-16h00 Tea break

16h00-18h00 Breakout sessions continue

18h15 Network reception

- *Hosted by WHO*

Tuesday , 31 May 2005

Plenary Session – Breakout Groups Reports

09h00-09h15 Day 1 Review

- *Chair*

09h15-10h30 Breakout Groups Report

- *Rapporteurs of Working Groups*

10h30-11h00 Tea break

11h00-11h45 Plenary discussion and agreement on Working Group plans

- *Chair*

Plenary session - panel discussion

11h45-12h30 Panel discussion: Household water treatment and safe storage in emergencies

- Moderator: *Dr Teófilo Monteiro, PAHO*

- Participants: *Mr Thomas Clasen, LSHTM; Mr Adriaan Mol, Bushproof; Ms N. Rhada, LEAD; Dr Greg Allgood, P&G; Dr Andrew Trevett, Cranfield University; Mr Endang Widyastuti, CARE Indonesia*

12h30-14h00 Lunch

Plenary session – Conclusions and closure

14h00-14h45 Next steps and concluding remarks

- *Chair*

14h45-15h00 Other issues

15h15-15h30 Tea break

Symposium poster presentations and technology demonstrations

15h30-17h30 Poster presentations (for Symposium) and technology demonstrations

3rd ANNUAL MEETING OF THE INTERNATIONAL NETWORK TO PROMOTE HOUSEHOLD WATER TREATMENT AND SAFE STORAGE

Breakout Group 1 – Advocacy and Communications

Co-chairs: Greg Allgood, P&G, and Bruce Gordon, WHO

Objectives:

- Review and further develop Network deliverables stemming from the Network Strategic Plan and the 2004/05 annual workplan.
 - Exchange views on key thematic topics, after “thought starter” presentations
 - Define a limited (e.g no more than 2-3 per sub-group) number of additional products that would be worked on collaboratively by the Network.
 - Establish a volunteer task force which would contribute to work on existing products or begin work on additional products during 2005/06.
-

14h00-14h30 Overview of the Breakout Session

Further discussion of deliverables presented in plenary

- Review of development of Network identity
- Review of website
- Review of newsletter
- Review of engagement at meetings
- Review of outreach
- Review of advocacy activities

14h30-15h30

Discussion Topics

Theme A) Tools and resources to support communications and advocacy

1. Videos as a promising advocacy resource (examples videos will be shown)
2. Electronic tools and resources, including the website
3. Key deliverables, including proposed Network advocacy glossy

Theme B) Effective outreach and engagement with decision-makers

1. Outreach to key other groups
2. Strategies for dissemination of materials
3. Engaging in meetings and planning next year’s Network meeting

15h30-16h00 Tea break

16h00-17h00 Discussion achieve consensus and synthesis towards a workplan and deliverables for 2005-2006, with linkage to existing deliverables and tasks.

17h00-17h30 Preparation of a Communications and Advocacy Work Group Report for the Plenary

**3rd ANNUAL MEETING OF THE INTERNATIONAL NETWORK TO
PROMOTE HOUSEHOLD WATER TREATMENT AND SAFE STORAGE**

Breakout Group 2 – Implementation Working Group

Chaired by Susan Murcott, MIT

14:00 -17:30

Objectives:

- Review and further develop Network deliverables stemming from the Network Strategic Plan and the 2004/05 annual workplan.
- Exchange views on key thematic topics, after “thought starter” presentations.
- Define a limited (e.g no more than 2-3 per sub-group) number of additional products that would be worked on collaboratively by the Network.
- Establish a volunteer task force which would work on each additional product during 2005/06.

14h00-14h30 Overview of the Breakout Session

Further discussion of deliverables presented in plenary

- Targets for Implementing, Monitoring and Evaluating Success of HWTS Initiatives
- Tools for formative research
- Scaling up
- Implementation in Several Countries
- Tracking Implementation: the IWG Survey – global mapping of implementation activities

14h30-15h30 Parallel sub-group sessions

Sub-group A)

“Targets for Implementing, Monitoring and Evaluating Success of HWTS Initiatives” and “Scaling up”

Moderator: Susan Murcott, MIT

- Aman Tirta: Ensuring widespread access to safe drinking water in Indonesia
Presenter: Robert Ainslie, John Hopkins University
- Targets of 10 HWTS Organizations in Kenya
Presented Susan Murcott, MIT
- Supplying product from manufacturer to user
Presenter: Laura Tew and Steve Li, Arch Chemicals

- Scaling Up – Successes and Obstacles
Presenter: Roshan Shrestha
- Sub-group begins discussion on key priorities where Network participants can add value in this area

Sub-group B)

Guiding implementers: tools, resources, education and training

Moderated by Camille Dow-Baker, CAWST

- Breakout discussion on implementation – what kind of guidance is most needed and how can the Network and its participants add value?
Discussion to be initiated by Camille Dow-Baker, CAWST
- How to best support HWTS initiatives to ensure behaviour change
Discussion to be initiated by Maria Elena Figueroa, John Hopkins University
- AED’s experience with formative research tools
Discussion to be initiated by Camille Saade, AED
- Sub-group begins discussion on key priorities where Network participants can add value in this area

15h30-16h00 Tea break

16h00-17h00 (Sub-groups continue) Definition of additional products and establishment of time-bound task force to carry these out¹.

17h00-17h30 Breakout group 2 re-assembles and prepares report back presentation

¹ IWA (International Water Association), unable to attend the meeting, has agreed to contribute to the production of a document guiding the implementation of HWTS options, targeted at children and adolescents

**3rd ANNUAL MEETING OF THE INTERNATIONAL NETWORK TO
PROMOTE HOUSEHOLD WATER TREATMENT AND SAFE STORAGE**

Breakout Group 3 –Research

Chair: Mark Sobsey, University of North Carolina

14:00 -17:30

Objectives:

- Review and further develop Network deliverables stemming from the Network Strategic Plan and the 2004/05 annual workplan.
 - Exchange views on key thematic topics, after “thought starter” presentations
 - Define a limited (e.g no more than 2-3 per sub-group) number of additional products that would be worked on collaboratively by the Network.
 - Establish a volunteer task force which would contribute to work on existing products or begin work on additional products during 2005/06.
-

14h00-14h30 Overview of the Breakout Session

Further discussion of deliverables presented in plenary by Mark Sobsey

- Review of updated “Managing Water in the Home”
- Research Working Group Survey
- Technology verification

Presenter: Joe Brown, UNC

- Cost-effectiveness of HWTS technologies

Presenter: Thomas Clasen, LSHTM

14h30-15h30 Parallel sub-group sessions

Sub-group A)

Lab and field research - technological (“hardware”)

Moderator: Stephen Gundry, University of Bristol

Discussion Topics (not necessarily listed in order of priority or importance):

4. Technology development and verification in the laboratory: what kinds of data are needed to substantiate performance? Protocols and key variables in **lab** testing Protocols key variables in **field** testing.
5. New developments and data needs for **existing technologies**: chlorine, SODIS, thermal processes, ceramic filters, combined flocculents/disinfectants, etc.

6. **New and emerging or candidate HWTS technologies:** Identifying and prioritising them for further development and verification.
 - a. **Example:** Rainwater harvesting as a HWTS technology
 - b. **Example:** Home cisterns or other bulk storage as a treatment and management system

Sub-group B)

Lab and field research – epidemiological, social, behavioural and economic (“software”).

Moderator, William Duke, University of Victoria

Discussion Topics

1. Criteria, models and tools for valid and successful field trials and of HWTS technologies: epidemiological, social and behavioural variables.
2. Study designs and test protocols for evaluating HWTS systems in field trials
3. Key variables to examine in field trials; questionnaires and other performance measurement tools
4. Cost, marketing and economic issues: How does technology cost, subsidy (or absence of it), and community SES, influence technology choices and performance and willingness-to-pay?
5. What research is needed to better understand the roles of these components in HWTS and to improve their introduction into communities and regions?
6. Approaches and tools to achieve and measure compliance, sustainability and dissemination.

15h30-16h00 Tea break

16h00-17h30 **Research sub-groups combine for reporting, discussion and synthesis of a task plan and deliverables for 2005-2006**

16h00-16h30 1. Subgroups reports (15 minutes each)

16h30-17h00 2. Discussion and of subgroup reports to achieve consensus and synthesis towards a workplan and deliverables for 2005-2006, with linkage to existing deliverables and tasks.

17h00-17h30 3. Preparation of a Research Work Group Report for the Plenary

Annex 2 – Symposium Agenda

2005 International Symposium on Household Water Management

Bangkok, Thailand

1-2 June 2005

AIT School of Management Amphitheatre

Wednesday, 1 June

Opening session

- 09h00-09h30** Welcome
- *Mr Terrence Thompson, WHO-WPRO*
- 09h30-09h45** Symposium Overview
- *Professor Mark Sobsey, University of North Carolina, Chair*
- 09h45-10h15** Keynote Address: Interventions to Improve Drinking Water Quality for Preventing Diarrhoea: A Systematic Review
- *Mr Thomas Clasen, London School of Hygiene and Tropical Medicine*
- 10h15-10:45** Break

Thematic session 1: Review, implementation, and scale up of household water treatment and safe storage

- *Moderator, Dr Rob Quick, US Centre for Disease Control*
- 10h45-11h00** Development Of Program Implementation, Evaluation And Selection Tools For Point-Of-Use Household Water Treatment And Safe Storage Systems In Developing Countries
- *Ms Susan Murcott, Massachusetts Institute of Technology*
- 11h00-11h15** Household Water Treatment Education: 8 years, 33 countries, all continents
- *Ms Camille Dow Baker, Centre for Affordable Water and Sanitation Technology*
- 11h15-11h30** Scaling-up Household Water Treatment Using a Social Marketing Approach
- *Dr Greg Allgood, Procter and Gamble*

11h30-11h45 Promotion of Point of Use Drinking Water Treatment in Nepal - An Experience
• *Dr Roshan Shrestha, Environment and Public Health Organization*

11h45-12h00 Questions and Answers

12h00-13h30 Lunch Break and Poster Session

Thematic session 2 – Household Water Treatment in Emergencies

- *Moderator: Dr Katherine Bliss, U.S. Department of State*

13h30-13h45 Guyana Post-Flood Safe Household Drinking Water Project
• *Dr Teófilo C. N. Monteiro, PAHO*

13:45-14h00 Household water provision in emergencies: Distribution of chlorine solution, rapid well jetting and bio-sand filtration
• *Mr Eric Fewster, Bushproof*

14h00-14h15 SODIS – A Simple Household Water Treatment and Safe Storage Technology - In The Context Of Tsunami
• *Ms N. Rhada, Lead*

14h15-14h30 Assessment of PUR purifier of Water for Providing Safe Household Water during Emergency Situations, including the Southeast Asia Tsunami
• *Dr Greg Allgood, Procter and Gamble*

14h30-14h45 Using PUR in diverse emergency situations
• *Dr Andrew Trevett, Cranfield University*

14h45-15h00 Preventing Diarrhoea Following a Flood Emergency: An Evaluation of Home-based Chlorination — West Timor, Indonesia, 2004
• *Dr Endang Widyastuti, CARE Indonesia*

15h00-15h15 Questions and answers

15h15-15h45 Tea Break

Thematic session 3 - Physical treatment, lab and field results

- *Dr Shoichi Kunikane, NIPH, Japan*

15h45-16h00 Preliminary Test Data on a Colloidal Silver Ceramic Filter for Household Water Treatment
• *Mr David J. Elliott, Solutions Benefiting Life*

- 16h00-16h15** Field Test of a Silver-Impregnated Ceramic Water Filter
- *Mr Michael Roberts, IDE*
- 16h15-16h30** Ceramic filter augmentation for the reduction of viruses in drinking water
- *Mr Joe Brown, University of North Carolina*
- 16h30-16h45** The Use and Performance of Biosand Filter in the Artibonite Valley of Haiti: A Field Study of 107 Households
- *Dr William Duke, University of Victoria, Canada*
- 16h45-17h00** Biosand Filter for Microbial Reductions Under Controlled Laboratory and Field Use Conditions
- *Mr Mark Elliott, University of North Carolina*
- 17h00-17h15** Household Water Treatment for Water from Surface Water: Ponds in Salinity Affected Areas
- *Mr R. Seenivisan, DHAN Foundation*
- 17h15-17h30** Questions and Answers
- 17h30** Announcements
- *Ms Arinita Maskey, Asian Institute of Technology*
- 18:00** Departure for dinner in ancient Thai capital of Ayuthaya

Thursday, 2 June

- 08h45-09h00** Welcome
- *Professor Mark Sobsey, University of North Carolina*

Thematic Session 4 - Household perceptions, preferences, and practices

- *Moderator, Dr Roshan Shrestha, Environment and Public Health Organization*
- 09h00-09h15** The perceived attributes of water and their effects on water treatment practices in Guatemala and Pakistan
- *Dr Larry Kincaid, John Hopkins University*
- 09h15-09h30** Combined Hand washing and Drinking Water Treatment for Diarrhoea Prevention, a Randomized Control Trial
- *Dr Stephen Luby, ICDRC Centre for Health and Population Research*

- 09h30-09h45** Bringing the consumer to the table: a formative research model to ensure consumer preferences
- *Mr Camille Saade, USAID-HIP (Hygiene Improvement Project) and Dr Rochelle Rainey, USAID Environmental Health Team*
- 09h45-10h00** Household perceptions, beliefs and practices regarding Safe Water in Pakistan.
- *Dr Mubina Agboatwalla, HOPE*
- 10h00-10h15** Householders' valuations of ceramic water filters: evidence from intervention studies in rural South Africa and Zimbabwe.
- *Dr Stephen Gundry, University of Bristol*
- 10h15-10h30** Questions and Answers
- 10h30-11h00** Tea Break

Thematic Session 5 - Implementation and behavior change

- *Moderator, Dr Maria Elena Figueroa, John Hopkins University*
- 11h00-11h15** Removing barriers to use of health products through social marketing and entrepreneurship: A case study of point-of-use water treatment in Kenya
- *Matt Freeman, Emory University*
- 11h15-11h30** Building on trust: change agents and medical providers motivating household water disinfection and safe storage in slum
- *Ms Vibha, Populations Services International, India*
- 11h30-11h45** The Safe Water System in Myanmar
- *Dr Mya Than Thun, Population Services International, Myanmar*
- 11h45-12h00** A community-based entrepreneurial strategy for household water treatment in urban Bangladesh
- *Mr Masudul Quader, DSK*
- 12h00-12h15** Diseases Caused by Drinking Contaminated Water and Hindustan Lever's Intervention
- *Dr Suresh Nadakatti, Hindustan Lever*
- 12h15-12h30** Questions and Answers
- 12h30-14h00** Lunch

Thematic Session 6a – Arsenic

- *Moderator, Dr Mao Saray, Director of Rural Water Supply Dept. and Chairman of Arsenic Sub-committee Ministry of Rural Development*

- 14h00-14h15** An integrated approach to arsenic mitigation in Bangladesh
- *Dr Shoichi Kunikane, NIPH, Japan*
- 14h15-14h30** Research needs for household level treatment to remove arsenic and fluoride from drinking water in SE Asia
- *Dr David Fredericks, WHO Consultant*
- 14h30-14h45** Kanchan™ Arsenic Filter (KAF) - Research and Implementation of an appropriate drinking water solution for rural Nepal
- *Mr Dongol Bipin, ENPHO*
- 14h45-15h00** Arsenic contamination of groundwater and its mitigation in Pakistan in the light of the situation in South Asia
- *Mr Irshad Ramay, AIT*
- 15h00-15h30** Break

Thematic Session 6b – Miscellaneous

- 15h30-1545** New Method For Removing And Inactivating Water-Borne Pathogens Utilizing Silane Treated Materials
- *Dr. William R. Peterson, Coating Systems Laboratories, Inc.*
- 15h45-16h00** Pilot study on the effect of an intervention using sodium dichloroisocyanurate (aquatabs) tablets for drinking water treatment in dhaka, bangladesh
- *Dr Akram Hossain, AIT*
- 16h00-16h15** Rapid Development of Information, Education and Communication Material to Promote Hygiene, Sanitation and Safe Drinking Water Following an Earthquake and Tsunami: — Aceh Province, Indonesia, 2005
- *Ms Rieneke Rolos, CARE Indonesia*
- 16h15-16h30** Questions and Answers
- 16h30-16h45** Summary and wrap-up
- *Professor Mark Sobsey, University of North Carolina*
- 16h45-17h00** Closing
- *Mr Han Heijnen, WHO-SEARO*

Annex 3 – Alliances for Large-scale HWTS Projects

Summary of the Discussions held at the Annual HWTS Meeting 2005, led by Mr Martin Wegelin of EAWAG/SANCDEC.

1. Background

So far, the main providers of HWTS methods (such as for chlorination, flocculation/chlorination, solar disinfection, filtration) promoted and disseminated their water treatment methods independently. Hence, it was rather a supply driven approach with regard to the promoted water treatment method. In a new initiative, it is suggested to change this approach to a demand driven strategy in which the target population is included in the selection of the water treatment they prefer.

In order to initiate the discussion for such an approach, Martin Wegelin, EAWAG/SANDEC presented at the beginning of the HWTS annual meeting 2005 the “Sandwich Approach”. The proposal received considerable interest by the different HWTS providers and by the HWTS research community.

2. Discussion on large scale HWTS projects

During the Bangkok Meeting the project criteria, the project structure and the procedure for the project preparation to initiate large scale HWTS projects were presented as shown in the attachment. The idea was presented and discussed with the following persons:

- Bruce Gordon, HWTS secretariat
- Terry Thompson, WHO WPRO
- Han Heijnen, WHO SEA
- Greg Allgood, P&G
- Robert Quick, CDC
- Tom Clasen, LSHTM
- Eric Oude, Practica Foundation
- Jeff Albert, Aquaya Institute
- Marc Sobsey, University of North Carolina
- Susan Murcott, MIT
- Maria Elena Figueroa, JHU/CCP
- Camille Dow Baker, CAWST
- Rochelle Rainey, USAID
- Roshan Shrestha, UN-Habitat

Most of them support the idea and are interested to participate in such joint large scale HWTS project. During the discussions the following proposal were made:

- to embark not only on large scale peri-urban projects, but to initiate programmes on a national basis (Greg Allgood)
- to approach and include potential donor agencies at a early stage of the project preparation (Greg Allgood and Rochelle Rainey)

- to held a meeting with World Bank office in Washington and to present the initiative (Greg Allgood)
- large scale HWTS projects are already planned for Ghana (Susan Murcott) and considered for Indonesia (Jeff Albert)

Martin Wegelin promised to summarise these discussions and to e-mail the same together with a small questionnaire for project descriptions (see attachment) to the discussion partners. Identified large scale HWTS projects will be announced on the Network Website and by listserv to the network members who will be invited for collaboration (call of cooperation on August 1st, 2005).

The above listed persons are also invited to participate at an international workshop to be held in Quito, Ecuador on October 6 and 7, 2005. During this workshop, the large scale HWTS project proposals will be presented, discussed and finalised. Confirmation of their participation is expected by June 20, 2005.

6.6.05 MW/ms

Annex 4 – Field Trips (3 June 2005)

Following the Network meeting, three field trips took place: one in Thailand kindly hosted by the Department of Health, and two in Cambodia, kindly hosted by IDE and Hagar respectively. Short descriptions follow.

DOH Thailand: HWTS and Water Quality Monitoring

Ban Kung Village is located in Changkrayai of Pathumthani province (about 10 km of AIT). It has been practicing some household drinking water treatment technology and also surveillance of drinking water. The half day visit to Ban Kung village focused on these two activities. There was a presentation of the project on household water treatment technology and surveillance of drinking water quality control by Mr. Puthai Gamonvarin, Provincial Public Health Office, Health Volunteer. Following this there was a field visit to Ban Kung Changkrayai, Pathumthani province, where participants could view a tap water System in Ban Kun Village together with water quality monitoring and surveillance by the villagers.

IDE Cambodia: Ceramic Filter Implementation

The silver-impregnated ceramic water filter is a low-cost household water treatment option that removes bacteriological contamination at the point of use. Ceramic filters are being produced and distributed in Cambodia through market channels. Participants visited a filter production factory, observed promotional activities, and had an opportunity to talk with filter retailers and end users.

Hagar / Samaritan's Purse Cambodia: BioSand Water Filter (BSF) Project

In Cambodia the BSF units are manufactured locally from concrete and require the involvement of the future recipients to assist in construction. This provides the opportunity for training in filter maintenance and education in health and hygiene practices. Hagar emphasizes the “software” elements of the program are just as important as the “hardware”. Participants traveled to Kompong Thom, about 2.5 hours north of Phnom Penh, to see the largest program of BSF filters in the world where over 6,000 filters have been installed.

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