



Strategic Meeting of the WHO International Scheme to Evaluate
Household Water Treatment Technologies

Nieuwegein, the Netherlands

23-24 March, 2015

Acknowledgments

The meeting was convened by the World Health Organization (WHO), and was jointly hosted by Aqua for All, IRC International Water and Sanitation Centre (IRC WASH) and the Directorate-General for International Cooperation (DGIS) of the Netherlands. The meeting was held at the KWR Watercycle Research Institute in Nieuwegein, the Netherlands. Our thanks to Aqua for All and KWR for graciously hosting this meeting.

Special thanks to the following meeting moderators and presenters:

Fanny Boulloud (Antenna Technologies)

Kelvin Chitumbo (National Water Supply and Sanitation Council, Zambia),

Chris Cormency (UNICEF Supply Division – Copenhagen)

Bettina Genthe (Council for Scientific and Industrial Research, South Africa)

Roshini George (Sera Global Health Practice)

Bruce Gordon (WHO headquarters)

Ha Thanh Hang (Ministry of Agriculture and Rural Development, Viet Nam)

Jan Heeger (Red Cross Netherlands)

John Kariuki (Ministry of Health, Kenya)

Daniele Lantagne (Tufts University, United States of America)

Batsi Majuru (WHO headquarters)

Maggie Montgomery (WHO headquarters)

Payden (WHO Regional Office for South-East Asia)

Natasha Potgieter (University of Venda, South Africa)

Kweku Quansah (Ministry of Local Government and Rural Development, Ghana)

Ton Schouten (IRC WASH)

Mark Sobsey (University of North Carolina, United States of America)

Waltaji Kutane (WHO Ethiopia)

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1. Introduction

The WHO International Scheme to Evaluate Household Water Treatment Technologies (Scheme) was launched in 2014¹ with the aim to guide WHO Member States and procuring UN Agencies in the selection of technologies. To meet this aim, the primary objectives of the Scheme are to:

- Promote and coordinate independent and consistent testing and evaluation of household water treatment products based on WHO criteria to determine their level of performance in removing pathogens²; and
- Support national governments in building the technical capacity of research and laboratory institutions for conducting complimentary assessments of HWT and, in general, applying WHO Guidelines on Drinking-water Quality recommendations at the national level.

In Round I, WHO coordinated the evaluation of ten products representing filtration, solar, chemical, UV and combination technologies. To maximize the impact of these evaluations, WHO is embarking on efforts to ensure that results are considered and used by procurement and regulatory authorities, and to strengthen the capacity of resource constrained countries to regulate and evaluate household water treatment.

A global strategic meeting was held on 23 and 24 March 2015 in Nieuwegein, the Netherlands to discuss key capacity building activities to support the Scheme. Approximately 30 participants representing health and regulatory officials from Ethiopia, Ghana, Kenya, Viet Nam and Zambia, as well as academia, NGOs, and international organizations attended the meeting and contributed meaningful inputs to the presentations, break-out sessions and prioritization of follow up actions. This report summarizes the meeting discussions and key recommendations.

2. Meeting overview and objectives

The objective of the meeting was to prioritize needs in the evaluation and regulation of HWT and develop a strategic plan for addressing these needs, with a focus on select countries. The specific objectives of the meeting were to:

- Present Round I results and global market assessment of major products of importance³;
- Discuss application of Round I results to procurement and regulatory processes, generally;
- Prioritize key needs and solutions to improve regulation, monitoring and evaluation and local product evaluation; and
- Strategize, through an action plan, on how to address key needs and advance global efforts to ensure HWT protect health of users.

Themes covered on Day 1 of the meeting included: overview of results from Round I of the Scheme and lessons learnt; preliminary findings from a market assessment of HWT devices; and country experiences from Ethiopia, Ghana, Kenya and Viet Nam on HWT regulation and field monitoring and evaluation. These presentations informed discussions held on Day 2, which were focused on priority actions for capacity building in countries. The detailed meeting agenda is attached as Appendix 1

¹ More information on the Scheme can be found at http://www.who.int/household_water/scheme/en/

² Evaluating household water treatment options: health-based targets and microbiological performance specifications. Geneva: World Health Organization; 2011

³ WHO has recently conducted a market assessment of HWT products; the report is forthcoming

3. Key issues and action items

The key issues discussed at the meeting included: the communication of the Scheme objectives and results among stakeholders; facilitating understanding and interpretation of the Scheme results; and strengthening regulation, evaluation of local products and field monitoring and evaluation of HWT. Several follow-up actions resulted from these discussions and are outlined as follows.

Improve communication of the Scheme objectives, results and impact of evaluations to key stakeholders

Communicate and disseminate key information related to the Scheme and HWT evaluation

An urgent priority highlighted is the communication of the Scheme objectives, its evaluation procedure, including costs and results, and its application among governments, procuring entities, NGOs and users at large. While a number of national laboratories currently conduct evaluations of HWT, there is no standard protocol against which testing is conducted. In addition, there is limited awareness of the concept of quantitative microbial risk assessment, which is the basis for performance targets in HWT evaluation; testing does not comprehensively address all the three classes of pathogens of concern in drinking-water (bacteria, viruses and protozoa), and is generally limited to bacterial compliance testing.

Clarify HWT performance classifications of the Scheme

Currently, the performance of HWT products evaluated under the Scheme is classified in one of three tiers: *Highly protective*, *Protective*, or *Limited protection*. While the basis of this classification is the health risks associated the three pathogen classes in each tier, there is limited understanding of these underlying risk analyses and thus the interpretation of these terms can be subjective. It was recommended that the nomenclature be revised and adopt less subjective terms, e.g. Tier 1, Tier 2 and Tier 3. In particular communications material should better articulate the value of the second tier as providing a comprehensive level of protection (protective against all three pathogen classes), including supporting information on the burden of diarrhoeal disease averted in each tier. In addition, communications will also articulate the relevance of the bottom tier in contexts of high disease burden / source waters have been characterized etc.

Facilitate wider participation of manufacturers in the Scheme

While there is a strong support for the Scheme as a global and harmonized approach to HWT evaluation, concerns were raised about its affordability, particularly for small manufacturers. As a priority action, WHO is working to reduce the cost of laboratory testing through the development of cheaper, but comparably robust test protocols, and the application of simpler subsidy schemes to attract less well-resourced manufacturers.

Establish an informal working group to inform and advance capacity building activities in countries

WHO will establish an informal working group to support capacity building activities by identifying priority actions and timelines and responsibilities for the implementation in countries, and supporting education and training activities. The working group will have representation from governments, NGOs, implementers and academics to ensure that capacity building activities are locally relevant and feasible. The main capacity building components are outlined below:

Strengthening regulation of HWT

Regulation of HWT products is generally weak and fragmented, with a predominant focus on chemical disinfectants, which are regulated as pharmaceutical products. As such, the testing of

these products is aimed at verifying the concentrations of the stated contents, and not their microbiological performance in inactivating pathogens. None of the countries presenting have robust mechanisms to assess product performance claims, nor accuracy of labelling. While some countries have national working groups to support the regulatory processes, these working groups are often administrative and not technical review groups and have no legal standing. Other key challenges that were highlighted include the need for fast-tracked evaluation of products in emergencies, and how to address political interference in the certification of HWT products (political pressure to approve certain products). It was agreed that WHO would work in-depth in selected countries to develop HWT evaluation protocols and certification approaches that address these issues. Participants noted that a case study documenting this approach in a particular country would be useful in drawing lessons and providing examples of how the approach can be adapted to the context of its implementation in other countries.

Facilitating assessment of local products

Presentations on local manufacturing of chlorine and ceramic pot filters suggested that their quality is highly variable and harmonized manufacturing guidance/checklists can have a positive impact on improving such quality. As such, WHO, with support from the workgroup members will work to improve manufacturing processes and strengthen quality management of these products. This will include adapting and applying the QA/QC checklist developed by the Ceramic Manufacturing Working Group and quality management tools for chlorine production in countries. In addition, it was highlighted that the scope of these local assessments could potentially be expanded to include bio-sand filter. Products that are distributed or sold internationally will continue to be evaluated under the WHO international Scheme.

Conducting field monitoring and evaluation of HWT

Field monitoring and evaluation of HWT is often project-based and the sharing of the data is limited. Discussions were centered linking monitoring to existing data collection platforms; adding HWTS questions to ongoing household survey systems mostly done by local statistical services (e.g., water quality survey and sanitation information system in Ghana); and linking with health management information systems (e.g. in Ethiopia information collected at household level). The use of simple mobile technology to collect data and acquiring consumer feedback could also be considered, and linking with NGOs through the WASH Cluster on their monitoring and evaluation activities. Such monitoring should be within the broader framework of safe water, not only HWTS, link with existing efforts of Water Safety Planning and water quality surveillance. Data would be shared amongst researchers, governments ministries, manufacturers and within learning platforms such as WASH learning group in Ethiopia, Learning Alliance Platform in Ghana, and the Partnership Office in Viet Nam and the WHO/UNICEF International Network on Household Water Treatment and Safe Storage.

4. Meeting sessions and discussions

The meeting was opened by Mr Sjeff Ernes from Aqua for All who welcomed meeting participants, and Mr Bruce Gordon from WHO, who laid out the objectives of the meeting and led the round of introductions. The meeting was divided into seven sessions, which are summarized below.

Session 1: The HWT Evaluation Scheme

Session presenters: Batsi Majuru (WHO), Bruce Gordon (WHO), Maggie Montgomery (WHO).

The first session began with presentations from Dr Batsi Majuru and Dr Maggie Montgomery (WHO), who gave an overview of the Scheme objectives, evaluation procedure as well as challenges experienced and lessons learned. A total of 26 expressions of interest for 29 products

were received in Round I, representing a range of technologies (chemical, solar and UV disinfectants, ceramic pot filter and ultrafiltration membrane devices etc.). Of these 29, 10 products were selected for evaluation. Results are currently being shared with manufacturers for comments and feedback and will be made public on the WHO website in May, 2015. The main challenges and lessons learnt from Round I include: incomplete information provided in product dossiers by manufactures, unclear use instructions on products, and the high time and financial demands associated with the use of *Cryptosporidium parvum* oocysts in evaluating the performance of HWT products against protozoan cysts. Together, these issues underscore the importance of the priority actions outlined in Section 3 of this report, which include the simplification of the Scheme evaluation protocols and capacity building in countries on HWT regulation, including product labelling, certification etc.

Session 2: The HWT Landscape: Country experiences from Ethiopia, Ghana, Kenya and Viet Nam

Session presenters: Waltaji Terfa (WHO), Kweku Quansah (Ministry of Local Government & Rural Development, Ghana), John Kariuki (Ministry of Health, Kenya), Ha Thanh Hang (Ministry of Agriculture & Rural Development, Viet Nam).

The first session provided an overview of country experiences from Ethiopia, Ghana, Kenya and Viet Nam in HWT regulation, monitoring and evaluation and the general HWT market. Presentations from these countries highlighted the following: (i) there is fragmentation in the approaches used, as well the entities involved in regulation and evaluation of HWT; (ii) field monitoring and evaluation of HWT is largely project-based and therefore based on varying project indicators; and (iii) a relatively small proportion of HWT products are produced locally, and criteria for their evaluation are largely lacking.

In Ethiopia, there is no harmonized approach for regulating filters, while chemical disinfectants are treated as pharmaceutical products. Thus, testing of chemical disinfectants is primarily aimed at verifying concentrations of stated ingredients, and not microbiological performance. The Food, Medicine & Health Care Administration & Control Authority (FMHACA) and Ethiopian Public Health Institute (EPHI) are involved in testing of chemical disinfectants, while the Ethiopia Standard Conformity Authority provide filter standards. Field monitoring of HWT is largely ad-hoc.

The Government of Ghana has recently developed a framework for HWTS that includes a national strategy; scale-up model, and private sector participation framework, which was released in May, 2014. For scale up, the country has been divided into 3 phases for government focus, through 2025⁴. While the national strategy outlines a plan to develop national standards, product labeling and certification process, technology assessment framework, and testing/ regulation process, it is yet to be implemented. The Ghana Food and Drug Administration is mandated to regulate 'household chemicals' and conducts post market surveillance of certified products. Approximately 5 % of HWT products are produced locally, while the rest are imported.

Approximately 90% of HWT products in Kenya, are imported, and these are primarily filters such as Lifestraw and chlorine disinfectants. The remaining 10% of products that are produced locally include ceramic filter pots, bio-sand filters, and natural flocculants such as *Moringa oleifera*. The Environment Hygiene and Sanitation Policy and Strategy aims at encouraging supply and demand of HWTS in order to increase access to safe water. While the Kenya Bureau of Standards (KEBS)

⁴ More details on the National Strategy for Household Water Treatment and Safe Storage in Ghana can be found at: <https://cltsghana.files.wordpress.com/2011/04/hwts-strategy-may-2014-final.pdf>

is mandated to test and accredit HWT products, the capacity to test and regulate products is limited, given the volume of products coming into the country, both for emergency situations and regular use. Due to porous borders, there are unaccredited HWT products on the market. The entities involved in field monitoring and evaluation of HWTS include the Ministry of Health, non-governmental organizations (NGOs), KEBS, and research institutions. However, such monitoring and evaluation is ad-hoc and does not cover all products. Criteria for evaluating locally produced bio-sand filters and ceramic pot filters exist, although the capacity to evaluate is limited.

In Viet Nam, the commonly used HWT technological include: slow sand filters, ceramic filters, flocculants, and chlorine disinfectants. Implementation of HWTS is largely project-based. The Ministry of Agriculture and Rural Development and Ministry of Health are the main stakeholders at the national level in coordinating activities and creating enabling environment for HWTS, and their primary focus is to promote HWTS through public-private partnerships. There are currently seven provinces in which HWTS is being implanted, and there are plans to expand and scale up to remote areas. No systems exist for licensing HWT products, and field monitoring and evaluation is project-based.

Session 3: HWT Procurement and Distribution:

Session presenters: Chris Cormency (UNICEF Procurement), Fanny Boulloud (Antenna Technologies).

Session Two was focused on the role of the Scheme in guiding procurement and distribution agents in the selection of HWT products. Procurement of HWT products by UNICEF has risen significantly in recent years, due to an increase in emergencies. The procurement process follows country specific guidelines and makes best efforts to ensure a competitive approach. While the Scheme evaluation results can guide in the selection process, a significant number of tested products (e.g. 40 or 50) is required before these results can be formally incorporated into procurement criteria.

Antenna Technologies highlighted the need for sustainable HWT markets, and shared an overview of the organization's work in this area. The Safe Water Project aims to support the achievement of human right to water in Nepal, India, Cambodia, Guinea and Pakistan by promoting innovative business models to scale up access to safe water for low-income households. The project is conducted through local partnerships, the monitoring and evaluation is supported by IRC WASH. The discussions from this session highlighted the need to evaluate more HWT products under the Scheme and concurrently ensure that there are sustainable markets for the products.

Sessions Four and Five: Scheme Capacity Building Plan and Market Assessment and Capacity Building Element 1: Strengthening HWT Regulation

Session presenters: Roshini George (consultant), Daniele Lantagne (Tufts University), Kelvin Chitumbo (National Water Supply and Sanitation Council, Zambia)

Sessions four and five highlighted the main findings from market assessment of HWT products conducted by WHO, and outlined the need to strengthen HWT regulation, based on examples from Haiti and Zambia.

Ms Roshini George presented the preliminary findings from a rapid market assessment of HWT in Ghana, Ethiopia, and Viet Nam and a desk review of household water treatment in Asia and sub-Saharan Africa. These findings highlight that HWT use is low, and is typically associated with emergencies and disease outbreaks. In sub-Saharan Africa, both imported and locally produced filters are available, but demand is inconsistent demand and distribution networks are poor. In contrast, there has been a strong growth in the filter markets in Asia. With regard to regulation, the finding was that consistent testing and regulation of HWT products is lacking. HWT products are

largely unregulated, and in the few cases that they are, such regulation is mainly limited to chemical disinfectants. In addition, while several countries do have laboratory capacity to evaluate the performance of HWT products, awareness of the appropriate HWT evaluation protocols is limited.

Dr Daniele Lantagne presented an overview of lessons learned from a HWT certification programme for products seeking approval for distribution that has been developed in Haiti. It was often difficult for regulatory officials to objectively review product information, as manufacturers provided misleading information that was irrelevant for the product under evaluation, did not address the product performance, or contained unclear use instructions. Recommendations from this presentation highlighted the need to build capacity among regulatory agencies objectively evaluate HWT products for certification and assessments of whether HWT products meet WHO performance targets.⁵

Mr Kelvin Chitumbo provided an overview of regulatory challenges from a drinking-water supply perspective in Zambia, and linkages with HWT. Several challenges exist for the National Water Supply and Sanitation Council (NWASCO) in their role as drinking-water regulator. Among these: (i) their mandate is limited to the regulation of the quality of water that is distributed in a piped network; leaving a regulatory gap in areas that do not have piped water supplies; and (ii) in some areas the infrastructure for the piped network has deteriorated and water supply is intermittent and of poor quality. Proposed approaches to address these issues were: strengthening linkages between utility regulators and health ministries who typically have oversight of surveillance monitoring, and developing approaches to support expansion of regulation to rural areas, including improving water quality monitoring and developing standards and guidelines appropriate for non-piped supplies.

Session Six: Capacity building element 2: Facilitating assessment of local products

Session presenters: Mark Sobsey (UNC), Bettina Genthe (Council for Scientific and Industrial Research, South Africa), Daniele Lantagne (Tufts University)

The session outlined approaches that can be used to conduct simplified assessment of HWT product performance and quality management of local products. Professor Mark Sobsey provided an overview of approaches that the Scheme could adopt to assist in developing, strengthening and expanding simplified evaluation of HWT products in countries. The need to focus on creating and building local capacity, hands on workshops/ training and proposed a way forward for rational but adaptable technology performance evaluation was also highlighted.

Ms Bettina Genthe from the Council for Scientific and Industrial Research (CSIR) in South Africa shared examples and lessons learnt from evaluating HWT technologies. While South Africa has a guideline document for HWT evaluation, the guideline only makes a cross reference drinking water guideline. Thus, there is harmonized approach for HWT evaluation. Evaluations have included all three main classes of pathogens (bacteria, viruses and protozoa), and various test organism and surrogates for these classes. Technologies that have been evaluated include flocculant-disinfectants, ceramic filters, solar and chlorine disinfectants. However, evaluation is mainly ad-hoc as HWT practice is relatively low in South Africa.

Dr Daniele Lantagne shared a presentation on a certification scheme for ceramic filter factories that is under development by the Ceramic Manufacturing Working Group (CMWG). The certification criteria include raw materials and processing; filter manufacturing processes; firing;

⁵ More information can be found in the following publication: Murray A, Pierre-Louis J, Joseph F, Sylvain G, Patrick M, Lantagne D. 2014. Need for certification of household water treatment products: examples from Haiti. *Trop Med Int Health*. doi: 10.1111/tmi.12445.

product efficacy (greater than 2 log₁₀ removal of *Escherichia coli*); packaging, health and safety etc. Findings from the assessment of four factories highlight that the quality of the filters produced is highly variable, and a harmonized quality management process such as the one presented is valuable.

Session Seven: Capacity building element 3: Field monitoring and evaluation of HWT

Session presenters: Maggie Montgomery (WHO), Ton Schouten (IRC)

The session explored ways in which the Scheme can assist in developing, strengthening and expanding approaches for field monitoring and evaluation of HWT. While the microbiological effectiveness of HWT is important, products must be used correctly and consistently in order to provide health gains, and monitoring and evaluation of such use is key. Dr Maggie Montgomery highlighted components of the HWTS monitoring and evaluation (M & E) toolkit and its application in the field. The toolkit includes an overview of: the purpose of HWTS and solutions, developing a monitoring and evaluation framework, core and expanded indicators as well as sample questions.

Mr Ton Schouten presented an overview of the monitoring and evaluation framework for Antenna Technologies' Safe Water Project. The dimensions of the monitoring and evaluation are three-fold: (i) enabling environment (for business environment, for water supply and quality, for public finance and subsidy, for development partners etc.); (ii) consumers and non-consumers (demand): use, motives and attitude, knowledge etc.; and (iii) HWTS businesses (supply): specifics of the business, strategies, marketing, distribution, finance sources, skills. The intent is to make monitoring an integral part of projects and use it to enhance sustainable business models, inform marketing strategies, promote the benefits of HWTS, and collect information about the viability (conditions) to reach the poorest households.

On the second day participants split into groups to discuss: (i) strengthening regulation; (ii) facilitating assessment of local products and (iii) field monitoring and evaluation of HWT. The main recommendations from these discussions are summarized in Section 3 of this report.

Conclusion

The meeting served to identify steps needed to address the major gaps in capacity building regarding the testing and evaluation of HWT products and outlined immediate next steps. WHO committed to improving communications around the Scheme and working to simplify protocols and consequently reduce costs of testing. In addition, WHO committed to working in-depth with several countries on the capacity building activities identified. Several participants committed to support these capacity building activities through involvement in the informal workgroup. WHO will call upon these members of the workgroup attending the meeting periodically to provide input, share feedback on progress and attend, where relevant, national/regional events associated with the activities summarized in the report.

Appendix 1: Meeting agenda

Day 1: Monday 23 March 2015

		Presenter / Facilitator
Welcome and meeting overview		
09:00 – 09:10	Welcome and introduction of participants	Sjef Ernes Aqua for All
09:10 – 09:20	Meeting objectives and overview	Batsi Majuru, WHO
09:20 – 09:40	<i>Roundtable: What do we want to get out this meeting and what can the Scheme achieve?</i>	Bruce Gordon, WHO
The HWT Evaluation Scheme		
09:40 – 09:50	The Scheme: overview of objectives and procedure	Maggie Montgomery, WHO
09:50 – 10:00	Summary of Round I, lessons learned	Batsi Majuru, WHO
10:00 – 10:15	<i>Facilitated discussion</i>	<i>Bruce Gordon, WHO</i>
10:15 – 10:30	<i>Coffee/tea break</i>	
The HWT landscape: Country experiences		
10:30 – 10:45	Experiences from Ethiopia	Heran Gerba Food, Medicine & Health Care Administration & Control Authority
10:45 – 11:00	Experiences from Ghana	Kweku Quansah Ministry of Local Government & Rural Development
11:00 – 11:15	Experiences from Kenya	John Kariuki Ministry of Health
11:15 – 11:30	Experiences from Viet Nam	Ha Thanh Hang Ministry of Agriculture & Rural Development
11:30 – 11:45	<i>Facilitated discussion</i>	<i>Jan Heeger Red Cross Netherlands</i>
HWT procurement and distribution		
11:45 – 12:00	Linking UNICEF procurement and HWT Scheme	Procurement
12:00 – 12:15	The Safe Water Project	Fanny Boulloud Antenna Technologies
12:15 – 12:30	<i>Facilitated discussion</i>	<i>Payden, WHO</i>
12:30 – 13:30	<i>Lunch</i>	

<i>Scheme capacity building plan and market assessment</i>		
13:30 – 13:40	Beyond testing: HWT Scheme capacity building plan	Batsi Majuru, WHO
13:40 – 14:55	Preliminary findings from HWT market assessment	Roshini George Consultant
14:55 – 14:10	<i>Facilitated discussion</i>	<i>Akosua Kwakye, WHO</i>
Capacity building element 1: Strengthening HWT Regulation		
14:10 – 14:20	Strengthening HWT regulation: Example from Haiti	Daniele Lantagne Tufts University
14:20 – 14:30	Drinking-water regulation: Implications for the Scheme	Kelvin Chitumbo National Water Supply and Sanitation Council
14:30 – 15:00	<i>Facilitated discussion: Application of the Scheme in regulatory processes</i>	<i>Bruce Gordon, WHO</i>
15:00 – 15:15	<i>Coffee/Tea</i>	
Capacity building element 2: Facilitating assessment of local products		
15:15 – 15:25	Approaches to facilitate local product evaluation	Mark Sobsey University of North Carolina
15:25 - 15:35	Evaluation of HWT products: Experiences from CSIR South Africa	Bettina Genthe Council for Scientific & Industrial Research
15:35 – 15:45	Quality assessment of local products; experiences of the QA/QC checklist for ceramic pot filters	Daniele Lantagne Tufts University
15:45 – 16:15	<i>Facilitated discussion: Developing simplified approaches for local evaluation</i>	<i>Natasha Potgieter University of Venda</i>
Capacity building element 3: Monitoring and Evaluation of HWT in the field		
16:15 – 16:25	The M & E toolkit on HWTS	Maggie Montgomery, WHO
16:25 – 16:30	M & E of the Safe Water Project	Ton Schouten, IRC WASH
16:30 – 17:00	<i>Facilitated discussion: Field monitoring and evaluation of HWT</i>	<i>Waltaji Kutane, WHO</i>
17:00 – 17:10	<i>Wrap up of Day 1</i>	<i>Batsi Majuru, WHO</i>
18:30 – 20:00	<i>Dinner, Mercure Utrecht Nieuwegein</i>	<i>All invited</i>

Day 2: Tuesday 24 March 2015

		Facilitator
09:00 – 09:20	Re-cap from Day 1, summary of key issues, and introduction of group work	Batsi Majuru, WHO
09:20 – 11:00	<p>Group work <i>Divide into 3 groups to develop priorities on key needs and solutions on the following:</i> Strengthening regulation of HWT Conducting field monitoring and evaluation of HWT Facilitating assessment of local HWT products</p>	Batsi Majuru, WHO Daniele Lantagne Tufts University Maggie Montgomery, WHO
11:00 – 12:30	Presentation of identified priorities and expected outputs	Bruce Gordon, WHO
<i>12:30 – 13:30</i>	<i>Lunch</i>	
13:30 – 15:00	Facilitated discussion: Action plan to address identified priorities and timeline	Daniele Lantagne Tufts University
<i>15:00 – 15:15</i>	<i>Coffee/Tea</i>	
15:15 – 16:00	Facilitated discussion: Commitments, next steps and conclusion	Maggie Montgomery, WHO
<i>16:00 -16:45</i>	<i>Tour of laboratory facilities at KWR Watercycle Research Institute</i>	<i>KWR</i>

Appendix 2: List of participants

	Organization	Position
Andrew Bastable	Oxfam GB	Head of Water and Sanitation
Fanny Boulloud	Antenna Technologies	Safe Water Coordinator
Kelvin Chitumbo	National Water Supply and Sanitation Council (NWASCO), Zambia	Director
Chris Cormency	UNICEF Supply Division	Chief of Water, Sanitation and Education Center
Sjef Ernes	Aqua for All	Executive Director
Bettina Genthe	Council for Scientific and Industrial Research (CSIR), South Africa	Senior Researcher
Roshini George	Sera Global Health Practice	Consultant
Bruce Gordon	WHO headquarters	Coordinator: Water, Sanitation, Hygiene and Health unit
Fiona Gyamfi	Ghana Standards Authority	Chemist
Le Thai Ha	National Institute for Environmental and Occupational Health	Acting Head of Medical Testing and Environmental Analysis Department
Ha Thanh Hang	Ministry of Agriculture and Rural Development	Director of the National Target Program of Rural Water Supply and Sanitation Standing Office
Jan Heeger	The Netherlands Red Cross	WASH Advisor
Henk Holtslag	Connect International	WASH Advisor
John Kariuki	Ministry of Health, Kenya	Deputy Director: Public Health
Waltaji Kutane	WHO Ethiopia	National Professional Officer: Environmental Health
Akosua Kwakye	WHO Ghana	National Professional Officer: Environmental Health
Daniele Lantagne	Tufts University	Assistant Professor
Batsirai Majuru	WHO headquarters	Technical officer: Water, Sanitation, Hygiene and Health unit
Maggie Montgomery	WHO headquarters	Technical officer: Water, Sanitation, Hygiene and Health unit
Hien Thanh Nguyen	UNICEF Viet Nam	WASH Specialist
Payden	WHO South-East Asia Regional Office	Regional Advisor in Environmental Health
Natasha Potgieter	University of Venda	Professor
Kweku Quansah	Ministry of Local Government & Rural Development, Environmental Health and Sanitation Directorate, Ghana	Programme Officer for WASH
Ton Schouten	IRC International Water and Sanitation Centre	Senior Programme Officer

Jo Smet	IRC International Water and Sanitation Centre	Senior WASH Expert
Mark Sobsey	University of North Carolina	Professor
Jeske Verhoeven	IRC International Water and Sanitation Centre	Programme Officer