Household Water Treatment and Safe Storage and Cholera

at the 6th World Water Forum (2012)

Proceedings from

Target 1.3.6: Increasing Scale and Impact of Household Water Treatment and Safe Storage through National Policy Support, Development, and Implementation

and

Target 1.3.7: Why are people still dying of cholera today: What practical solutions could we suggest?

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1. World Water Forum and Thematic Priority 1.3

The 6th World Water Forum, held 12-17 March 2012 in Marseille, France, established five "thematic priorities" and targets to guide discussion and promote solutions to the most pressing world water challenges. One of these thematic priorities focused on the links between safe water, sanitation, and health (Thematic Priority 1.3).[1] Other thematic priorities focused on the right to water, access to sanitation, disaster preparedness, and peace and cooperation. Thematic Priority 1.3 was coordinated by the World Health Organization (WHO) and the United Nations University Institute for Water, Environment & Health (UNU-INWEH) and consisted of six targets, including two concerning household water treatment and safe storage (HWTS) and cholera. The targets are:

> **Target 1.3.6 on HWTS:** By 2015, 30 additional countries will have established national policies and/or regulations regarding household water treatment and safe storage; by 2018, 50 more countries will have reached this target; the scale-up process will be based on gradual and measurable increase of sound evidence of the public health benefits of this approach.
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> **Target 1.3.7 on cholera:** By 2015, an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera will have been anchored in 4 countries of Central Africa, with a major emphasis on ensuring sustainability through water and sanitation infrastructure development. By 2018, this approach will have been replicated in additional African high cholera incidence countries, pending the on-going cholera situation in 2015.

These two targets were discussed during World Water Forum sessions held on Tuesday 13 March and Wednesday 14 March and the proceedings, outcomes, commitments and recommendations from these sessions are the subject of this report.[2] This report also contains selected "solutions" for these targets that had been submitted to the World Water Forum's website in response to a worldwide open call for innovations and evidence-based methods.

The burden of diarrheal diseases is largely borne by developing countries and drains vital resources from impoverished economies. According to the most recent available WHO estimates each year 1.9 million deaths result from diarrheal disease and 88% of these are attributable to unsafe drinking water, inadequate sanitation, or insufficient hygiene. The majority of these deaths occur in children under the age of five (WHO, 2004). After pneumonia, diarrhea is the second leading cause of death among young children (Black et al, 2010). Cholera is an acute diarrheal disease that results in an estimated 3-5 million cases and 100,000-120,000 deaths every year (WHO, 2011d).

[1] A description of all the thematic priorities and targets can be found here: http://www.worldwaterforum6.org/en/.

[2] This report has been prepared by Mr Ryan Rowe of the Water Institute at the University of North Carolina at Chapel Hill with input from Dr Maggie Montgomery, Dr Claire-Lise Chaignat at the World Health Organization, and Sandhya Bonnet of Veolia Environnment Foundation.

2. Outcomes, Commitments and Recommendations

Outcomes

The main outcomes of these sessions were:

- Updates on progress toward Targets 1.3.6 and 1.3.7;
- Stakeholder commitments toward the advancement of HWTS and cholera prevention;
- Lessons from field-based implementation of HWTS and cholera programmes;
- Connecting with prospective and existing stakeholders of the *International Network on Household Water Treatment and Safe Storage* and the *Global Alliance Against Cholera*;

Commitments

Prior to the session, sector stakeholders committed to the following, *in respect of household water treatment and safe storage*,

Advocacy groups will:

- Work collaboratively with groups addressing the human right to safe and clean drinking-water and promote the role of HWTS in realizing this right;
- Raise awareness about the importance of safe drinking-water in combating neglected tropical diseases (i.e. role of improved safe storage lids for preventing dengue);
- Reach out to major efforts to combat and reduce communicable diseases such as HIV/AIDS and malaria and raise the profile of the preventive role of HWTS;

Donors will:

- Invest in HWTS as a solution within integrated Water, Sanitation and Hygiene (WaSH), nutrition, child health, HIV/AIDS and emergency relief programmes;
- Use WHO/UNICEF recommended monitoring and evaluation HWTS indicators (WHO, 2012);
- Support collaborative research on innovative financing and health behavior change approaches that foster sustainability of HWTS;
- Support dissemination of WHO recommendations for evaluating HWT performance (WHO, 2011c);

Governments and policy-makers will:

- Adopt and/or strengthen HWTS policies within existing health frameworks as well as drinking-water, education, emergency preparedness and environment mandates, policies and strategies;
- Integrate HWTS as a preventive tool in national maternal health, HIV/AIDS care and prevention and nutrition programmes;

- Initiate a process to develop or strengthen national certification programs, using the WHO recommendations (WHO, 2011c);
- Recognise within appropriate legal instruments the role of HWTS in fulfilling the human right to safe and clean drinking-water;
- Provide support to local universities to conduct applied research on sustainable HWTS solutions;
- Assist local manufacturers and businesses in providing affordable HWTS solutions;
- Address importance of safe drinking-water and culturally appropriate solutions to water treatment in school curriculum;

Implementers will:

- Conduct assessment of needs and drinking-water quality risks (i.e. through a Water Safety Plan) to better target HWTS where it is needed most;
- Use WHO/UNICEF recommended indicators of monitoring and use of HWTS (WHO, 2012) and share data to increase understanding of regional and global trends;

Researchers will:

- Focus on evidence gaps regarding continued and correct use, sustaining behavior change, delivery mechanisms for scaling-up, cost-effectiveness and benefits of integration of HWTS and role of safe storage in preventing vector-diseases; and
- Work with policy-makers to translate research findings into policy and funding directives;

in respect of cholera key stakeholders will,

- Implement concrete actions in Central Africa cholera hotspot countries (Chad, Cameroon, Nigeria and Niger);
- Organise an international workshop on integrated cholera response;
- Document new lessons learned starting from 2012 and conduct impact studies on cholera epidemics; and
- Based on lessons learned, develop and implement new cholera integrated programmes in Central Africa countries.

Recommendations

The main recommendations arising from these sessions were, *in respect of household water treatment and safe storage:*

- Report on the WHO global survey on HWTS national policies and establish baseline figures in respect of Target 1.3.6;

- Continue efforts to inform implementation and policy relating to: HWTS in emergencies; integration with broader health programmes such as HIV/AIDS prevention and care, maternal and child health, and nutrition; technology performance evaluation; and inclusion of HWTS in national health sector policies and strategies.

in respect of cholera:

- Adopt and promote an approach integrating water and health for a sustainable response to cholera epidemics, including improvement of the water and health systems through enhanced involvement of affected countries' governments;
- Provide medium and long term prevention and control measures, which extend beyond the immediate outbreak response; and
- Increase and improve coordination between the water and health sectors to elaborate a common strategic action plan leading to operational implementation of a sustainable fight against cholera.

3. Solutions

The theme of the 6th World Water Forum was "*Time for Solutions*" and the organizing committee established an online platform to collect and share innovative and evidence-based solutions to the world's water issues across multiple dimensions and disciplines. During a period of several months, over 30 solutions were submitted in respect of HWTS and cholera prevention. In order to facilitate the sharing of this information, we have selected a number of these solutions and listed them in Annexes 5a and 5b.

Furthermore, the Rural Water Supply Network, a global network for rural water supply organizations and professionals, also collected several solutions in respect of HWTS, mentioned in section 4.7 of their final report of their proceedings at the Forum, available at: http://www.rural-water-supply.net/_ressources/documents/default/1-359-2-1341319418.pdf.

4. Proceedings of HWTS Session

Background

Low-cost interventions for household-based treatment of drinking-water and safe storage can significantly reduce the pathogen load in drinking-water and, thereby reduce the risk of diarrheal diseases. The 7-point strategy for comprehensive diarrhea control, adopted by the United Nations Children's Fund (UNICEF) and WHO in 2009, includes household water treatment and safe storage as a proven intervention to reduce child mortality (UNICEF & WHO, 2009). Achieving tangible results in the scaling-up of household water treatment and safe storage depends, in large part, on national enabling environments and policies. The international target on establishing national HWTS policies was set in 2011 by the International Network on Household Water Treatment and Safe Storage (the Network) and subsequently adopted by the World Water Forum as Target 1.3.6.

The Network

The purpose of the International Network on Household Water Treatment and Safe Storage is "*to contribute to a significant reduction in water-borne and water-related vector-borne diseases, especially among vulnerable populations, by promoting household water treatment and safe storage as a key component of community-targeted environmental health programmes*". The Network, established in 2003 by WHO and as of 2011 co-hosted by WHO and UNICEF, includes those international, governmental and non-governmental organizations, private sector entities, and academia that subscribe to the above mission. The main areas of Network activity are reflected in four working groups: policy/advocacy, research/knowledge management, implementation/scale-up and monitoring and evaluation.

Session objectives and programme

The HWTS session was held on Wednesday, 14 March, 2012 from 14h30-16h30.
The overall objective of the session was to bring together implementers, government officials, researchers, and the private sector to discuss the importance of national policies and linkages to effective implementation and sustainable solutions.

Specific objectives included:

- *Policy:* Elaborate importance and status of national HWTS policies and targets;
- *Implementation*: Discuss key implementation approaches and needs and links to national policies; and
- *Commitments*: Develop harmonised list of priority commitments from governments, donors and implementers.

The session programme can be found in Annex 1a.

Presentations and discussions

The session was opened by WHO and followed by four presentations on selected household water treatment solutions by SWAP, Eawag, Helioz R&D and WASHConsult. This was followed by a presentation on the initial results of the WHO global survey on policies relating to HWTS. Next, officials from the Ministry of Health in Thailand and the Ministry of Public Health & Sanitation in Kenya spoke about their respective efforts in integrating HWTS into health policies and strategies. Then, representatives from USAID, Vestergaard-Frandsen, Medentech and Eawag discussed major challenges and solutions in scaling up HWTS. Audience and speaker interaction was moderated by representatives from SWAP, Innovations for Poverty Action and the Global Environment and Technology Foundation. The session ended with participants making verbal "commitments" and statements of support to further the work of targeting HWTS to those most at risk for waterborne disease. Links to download the presentations are provided in Annex 3a. Over 60 individuals attended the session from a range of different organizations, as listed in Annex 4.

1. Opening remarks on Target 1.3.6

Dr Maggie Montgomery, Contributing to health gains and the universal human right to safe drinking-water

Dr Montgomery, Technical Officer for Water, Sanitation, Hygiene and Health at the WHO in Geneva and Co-Coordinator of the WHO/UNICEF International Network on Household Water Treatment and Safe Storage began by introducing the session agenda and objectives. She highlighted that HWTS is a preventive health intervention and evidence indicates that the greatest health benefits are realised when HWTS is used correctly and consistently by vulnerable populations such as infants, the malnourished and the immuno-compromised. HWTS is recommended by UNICEF and WHO as part of a 7-point strategy on diarrhea control (UNICEF & WHO, 2009) and is included in WHO and USAID guidance on HIV/AIDS prevention and care (USAID & WHO, 2010). She also described that in order to better inform which HWT options are selected, WHO has recently published criteria and guiding principles for evaluating and assessing the performance of HWT (WHO, 2011c). For the first time, there are now global criteria to evaluate whether an HWT option reduces waterborne pathogens sufficiently to protect health. Through regional workshops and action plans WHO and UNICEF are aiding efforts to translate these recommendations into national policies and strategies. Dr Montgomery invited audience members to participate in the Network and join these efforts.[3] Dr Montgomery concluded by thanking those who had submitted their HWTS solutions to the World Water Forum's website, a list of which can be found in Annex 5a.

2. HWTS as a proven health intervention and selected solutions

Ms Alie Eleveld, The SWAP distribution model of household water treatment and health products

Ms Eleveld is the Country Director for the Safe Water and AIDS Project (SWAP), a non-government organization serving Western Kenya. SWAP works with HIV support and self-help groups to promote and sell water treatment and other health products as an income-generating activity that also benefits the wider community. The organization focuses primarily on Nyanza and Western Provinces in Kenya where the burden of disease from HIV/AIDS, malaria and diarrhea is particularly high. In these areas, there is limited access to safe drinking-water and HWTS provides a means to improve water quality. The main focus of SWAP is on promoting cost recovery through a model where self-help groups purchase products at wholesale prices and sell them in the community at retail. The SWAP model emphasises both research and implementation so as to ensure a process of continuous improvement and evidence-based practice. SWAP uses an integrated approach to program implementation and Ms Eleveld provided examples of how HWTS is a component in other WASH and health projects. Ms Eleveld invited participants to contact her should they wish to learn more about SWAP's activities.

Dr Regula Meierhofer, Solar water disinfection

Dr Meierhofer is head of the SODIS Reference Center at Eawag, a research institution based in Switzerland, which is focused on advancing knowledge and practice of solar disinfection

[3] The Network Phase II Strategy (2011-2016) can be downloaded at: http://www.who.int/entity/household_water/resources/NetworkStrategyMar2011.pdf.

(SODIS) techniques for water purification. Research into SODIS began in 1991 and wider promotion and implementation in the field began in 2001. Dr Meierhofer indicated that there are currently approximately 5 million SODIS users worldwide. Challenges of HWTS, including SODIS, is the need to use it consistently and correctly to achieve the desired health impact, integration with other WASH interventions to address the full range of risk factors, ensuring reliable supply of PET bottles, improving government support for the practice and achieving sustained behavior change. Dr Meierhofer provided several examples of interventions which included user training, marketing campaigns and advocacy work.

Ms Martina Podeprel, Feasibility for WADI in India

Ms Podeprel is Chief Operating Officer at Helioz R&D, a research & development firm based in Austria, whose flagship product WADI monitors the extent to which solar-based ultraviolet disinfection has occurred. It is intended for use in conjunction with SODIS programs and tracks the amount of ultraviolet radiation using a status bar and a smiley face. The current unit cost for a device is US$10 and has a useful life of five years. Reduced prices are available for non-government organizations and schools. Helioz R&D is currently assessing the results of a feasibility study in India which was co-funded by the Austrian Development Agency. Ms Podeprel highlighted that the device can be used by individuals or organizations to demonstrate the effects of SODIS and thereby raise awareness of local water quality and stimulate behavior change. Continued use of the device over time is recommended to achieve lasting behavior change.

Mr Jan Heeger, Use of household water treatment in emergencies

Mr Heeger is an independent consultant on water, sanitation, hygiene and health matters, with prior experience working with UNICEF and Médecins Sans Frontières in the East and Southern Africa region. His presentation focused on point-of-use water treatment and safe storage as a strategy to deliver clean water to populations affected by emergency situations or humanitarian disasters. Mr Heeger gave examples of how HWTS had been effectively used in recent emergencies as described in his presentation the day prior at the cholera session. HWTS has also been distributed to families of cholera patients to prevent the disease from spreading within the household. Different products are used depending on the availability and supply of product in the local market and the quality of the local water supply. Mr Heeger emphasised that selecting familiar HWTS methods is crucial especially in chronic emergencies to ensure long-term use. He cited the example of a ceramic filter factory in Somalia which was launched two years ago with support from the Red Cross and has been so successful it cannot keep up with demand.

Q. Othniel Habila, UNICEF Ghana: *I have a question for Regula. Social norms are important. In Ghana we are combining a number of initiatives, for example safe excreta disposal through CLTS. Such an intervention has behavior change as a key success factor. I am quite familiar with social norms in the context of sanitation and would like to hear more about behavior change issues in the context of HWTS.*

> **A. Regula Meierhofer:** One challenge is how to assure that a behavior change process is implemented sustainably. Firstly, governments need to be informed, and policy support needs to be there. This should be a commitment arising from this session. Regarding social norms for HWTS – it is a bit more difficult to monitor use of HWTS in comparison

to sanitation where you can see if a latrine has been built and used. Perhaps people could add a sticker to their door saying that they treat their water or government could use posters to promote and reinforce social norms.

Q. Sean Furey, Skat / RWSN: *I work with the Rural Water Supply Network, which has a lot of stakeholders in common with the HWTS Network. My concern is the sustainability of such a "magic box" – the WADI box would be too expensive for a typical rural family and we can't subsidise this for 800 million people. Scalable solutions lie in transferring knowledge to local people to allow them to develop local solutions.*

A. Martina Podeprel: The WADI is one of the cheapest such products in India – feedback has indicated that it could even cost a bit more and that would still be acceptable, i.e. there would be a willingness to pay. Perhaps the flashiness of the product acts as a certain status symbol.

A. Regula Meierhofer: Yes, it may be a high price but an indicator could have a very important role in training communities, and it fills a valuable niche and need in terms of monitoring implementation of SODIS although may not be necessary in every household using SODIS.

Q. William Carter, IFRC: *Do you have a cost per beneficiary for your program?*

Q. Beverly Pillars, Potters for Peace: *One of the problems with these solutions is promotion and scale-up, they are usually promoted by small organizations that don't have the resources - what have people's experience been in getting governments to promote such solutions?*

A. Jan Heeger, WASH Consultant: Free distribution of HWTS needs to be provided to the more vulnerable groups – this is what they did with mosquito nets – for example with HIV/AIDS groups.

A. Martina Podeprel, Helioz R&D*:* I agree with subsidised use of magic boxes, or even use of incentives to have people use the products.

A. Alie Eleveld, SWAP: We refer aspiring entrepreneurs to local micro-finance organizations that can assist them to raise the capital to purchase our products at wholesale prices.

A. Maggie Montgomery, WHO: There are a range of funding mechanisms available (from full subsidy to full cost recovery) and depending on the population group in question some mechanisms may be more appropriate than others. This is a topic that generates a lot of interest. The government officials may have more to add on this subject during our next panel.

Q. Sjef Ernes, Aqua for All: *There are many innovative financing mechanisms. Vulnerable groups should have products for free. We also need to consider that status can drive a commercial strategy for a product. Can we have some more elaboration on distribution mechanisms – perhaps SWAP can offer some insight into this?*

A. Alie Eleveld, SWAP: We have spent a lot of time with our self-help groups and we try to figure out ways of engaging and educating them. We make follow-up visits every couple of weeks, and we help them with re-stocking. The biggest incentive for the groups is not the increased income. It is the reduced stigma and community acceptance.

Q. Sjef Ernes, Aqua for All: *Are people making the choice to do this?*

A. Alie Eleveld, SWAP: Those who are better off are often supporting those who are worse off. There is cross-subsidization within the group.

A. Kepha Ombacho, MOPHS: SWAP is just one of the options. The government is looking at different options and has a working group to discuss different options. Consumers do have a choice with SWAP, if one is more expensive they can choose something else. When private sector works on solutions, they need to be sensitive to issues of economics, and issues of access. In Kenya, private sector and government are working together. If technology is expensive then access will be limited. Issues of supplementing access to vulnerable group must be addressed and in Kenya we are looking at that – sometimes a bit of subsidy is necessary in order to increase access.

3. Importance of national policies for scaling up

Dr Maggie Montgomery, Global overview of Household Water Treatment and Safe Storage Policies

Dr Montgomery gave a brief presentation on the initial results of a WHO-led global survey on national HWTS policies. Of 45 countries responding to the survey as of March 2012 30 of them indicated that HWTS is addressed in national policies and strategies and 19 countries have targets addressing needs among vulnerable groups and/or those without safe drinking water supplies. The greatest number of responding countries was from Sub-Saharan Africa. Water, health and emergency/disaster relief sectors were those that had most frequently considered HWTS among their plans. The survey will inform the assessment of progress toward the Network's target of 30 additional countries with policies in this area by 2015.

Ms Suree Wongpiyachon, Thailand Ministry of Health

Ms Wongpiyachon is the Director of the Bureau of Food and Water Sanitation in the Department of Health with the Thailand Ministry of Health. She explained that Thai policy considers water, sanitation, and hygiene within the context of public health. The country's main issue is not access to water but water quality and improper hygiene. There is low access to safe, piped drinking-water and storage practices are inadequate. As a result the ministry has developed a campaign to educate women on treating water in different ways, such as boiling, filters and chlorine. About 2000 volunteers have been recruited to help move this campaign forward in households, schools, health care facilities and religious institutions.

Dr Kepha Ombacho, Kenya Ministry of Public Health and Sanitation

Dr Ombacho is the Chief Public Health Officer at the Kenyan Ministry of Public Health and Sanitation whose overall objective is to provide leadership to the water and sanitation sector. One of their main areas of focus is diarrheal disease as it is the second-leading cause of the burden of disease in the country. Dr Ombacho emphasised that the Ministry's role is to create the

conditions for an enabling environment in which other actors can be more effective in their roles. While health policy is often very broad, the benefit of water and sanitation to public health is very clear and are a priority for the Ministry. With respect to HWTS, the Ministry is now developing a strategic framework to address various issues and engage a variety of actors. Initiatives include a forum and a newsletter.

Q. Robert Fraser, IFRC: *Dr Ombacho, how have you handled the debate over subsidy and non-subsidy within Kenya?*

Q. Unnamed representative, 300in6: *Dr Ombacho, how many options in HWTS are currently available in Kenya in the commercial market?*

Q. David Wilcox, ReachScale: *I would like to share a brief anecdote with the audience. Recently I had a conversation with an organization that has several hundred projects going on around the world and he was stunned when several researchers have told him that they should not use health improvements as a justification for funding water projects. How do the government participants feel about this? Has this issue ever arisen?*

Q. Othniel Habila, UNICEF Ghana: *I am interested to know from Thailand and Kenya what is happening around M&E in your countries? What about standardization of product performance?*

> **A. Kepha Ombacho, MOPHS:** Regarding subsidies, we consider water to be a public good for public health. If one were to look at our current strategic plan, we attempt to discourage a dependence on subsidies in Kenya. Our view is that it creates dependence on some external mechanism to be able to do what you are supposed to do. That is our official stance. In regards to how many options are available, I do not have a specific number. However in Kenya, we subject products to technological verification. If it is seen to be cost-effective for the communities then we will introduce it. So we will allow as many products as possible if it is cost-effective. And, Mr Wilcox, regarding the issue that you experienced – whenever you want to connect a disease to a specific risk factor, it is difficult to make a causal link, but we still need to control for it. If we can use an integrated approach and control an array of risk factors, then we are minimizing the risk all around. We can also use proxy indicators to indicate what would be the cause of the disease. Regarding standardization, many MOHs are dealing with issues of water safety.

Q. Othniel Habila, UNICEF Ghana: *Pardon me for interrupting but allow me to clarify - I am talking about standardization of HWTS. I would like to know if you have a mechanism to standardise it – I am not talking about water quality but about making sure that products achieve a common standard of performance.*

> **A. Kepha Ombacho, Kenya Ministry of Public Health and Sanitation:** What we are trying to address is to make sure that behavior change is occurring; we are trying to increase the access of communities to the technology.

A. Suree Wongpiyachon, Thailand Ministry of Health: In Thailand, there are several agencies that are tasked with ensuring household access to water. We also feel that all stakeholders should participate in the discussion, including consumers. We also do monitoring by checking bacterial contamination and residual chlorine. In the villages, we teach them to monitor bacterial aspects. We also consider sustainability in our approach and look at it from an integrated perspective, considering sanitation, as well as hand-washing. As an aside, this coming World Water Day will be a special day for our Ministry in Thailand.

4. Linking policy to implementation and HWTS solutions

Mr Tim Neville, Vestergaard-Frandsen

Mr Tim Neville is a public health consultant with Vestergaard-Frandsen, a Switzerland-based manufacturer. The company has a mission of developing products to support the achievement of the MDGs. Their LifeStraw portfolio is an intervention to help reduce the incidence of diarrheal disease through the treatment of drinking water at the point of use. Mr Neville commented that they feel challenged by diverging country standards and thus were pleased with WHO's publication of HWT performance recommendations (WHO, 2011c). Mr Neville expressed support for efforts to disseminate this work and establish and implement national guidelines based on the same. Mr Neville mentioned the firm's current innovations for the WASH sector which include a household filtration product with a 7-litre storage capacity, a community filtration product with a 25-litre capacity that also acts as a hand-washing station, and a hand hygiene towel which removes 90% of bacteria and is intended to facilitate safe hand-washing.

Mr Kevin O'Callaghan, Medentech

Mr O'Callaghan is the Sales & Marketing Manager for Medentech, a manufacturer based in Ireland, which produces the Aquatabs product and is a founding member of the Network. Mr O'Callaghan said that Medentech has learned that a commercial approach to HWTS does not work in all contexts. In Zimbabwe, for example, high inflation and challenging economic conditions eroded the purchasing power of local people to the extent that subsidies were necessary to achieve uptake. In Ethiopia, conditions were more localised such that higher income groups expressed a greater willingness to pay non-subsidised prices for Aquatabs. Mr O'Callaghan also mentioned two other challenges: firstly, how to achieving lasting behavior change, and secondly, increasing collaboration between non-profits and the private sector. Mr O'Callaghan said that using a commercial model to reach the poorest of the poor may be a utopic vision and expressed doubt that the sector can achieve scale in this way. He finished by asking the audience to consider what decision criteria might help inform the policy and implementation of subsidy programs.

Ms Merri Weinger, United States Agency for International Development

Ms Weinger, Program Manager – Hygiene Improvement for USAID, the development agency arm of the United States government, mentioned that USAID has been actively supporting and involved in the Network for the last ten years. Most recently USAID provided funding to support a five-year project called POUZN. The project produced knowledge on effective marketing approaches and behavior change. However a key challenge that remains is how to achieve and effectively promote *correct and consistent use*. There is still a gap between product trial and continued use and in order to scale up HWTS on a sustainable basis, we need to understand how

to narrow that gap. Filtration methods are particularly effective and hold a status symbol but tend not to be affordable for many consumers. In Bangladesh, for example, HWTS may need to be a long-term solution given the presence of arsenic in the groundwater. She queried whether the body of evidence is now strong enough to make the case for HWTS as a health sector intervention rather than a water sector intervention. She reiterated points made by others in relation to the use of subsidies and asked the audience: "*If we consider access to clean water a public good, should it then be as heavily subsidised as vaccines?*"

Q. Sean Furey, Skat: *The mobile phone industry and giant consumer products companies like Coca Cola have massive marketing budgets and by extension, huge campaigns. Do you think that scaling up of HWTS is just a question of massive social marketing or is HWTS more nuanced? I would like to hear from the government officials and those who can comment on the private sector perspective.*

A. Suree Wongpiyachon, Thailand Ministry of Health: Good question. Marketing is often focused around commercial, material products. For example, if we think of plastic bottled water, they are even reaching the local villages. But if you look at rainwater, which you can collect freely, it is less widely used than bottled water which has a cost! Consumer behavior has become almost automatic, people are not really thinking about their consumption without thinking of the future.

A. Merri Weinger, USAID: I don't think that the challenge to scale up HWTS is an advertising problem. I have seen our best social marketers out there, so from my point of view it is clearly a behavioral issue. In the past we have used an inadequate indicator to measure success, namely product sales. What we need to do is begin measuring correct and consistent use. We also need to find products that are more desirable, user-friendly, and affordable.

A. Kepha Ombacho, Kenya Ministry of Public Health and Sanitation: Advertising is not the issue. It is a behavioral matter, and the responsibility for stimulating that behavior change lies with governments.

A. Regula Meierhofer, Eawag: Performance monitoring is important – we need to see what programmatic approaches are effective so that we can begin disseminating what works and what doesn't.

A. Kevin O'Callaghan, Medentech: Coca Cola has one of the biggest distribution networks in the world. It is in a category of its own. We could do heavy marketing, but it would raise our product costs. What we committed to do is not to raise our product costs in order to maintain its accessibility as much as possible. And indeed, Aquatabs is actually the same price now as it was five years ago.

Q. David Rounce, University of Texas: *There are many good technologies being implemented by NGOs in different places. Based on my experience, ability to choose can help increase continued use. What do you think?*

A. Merri Weinger, USAID: We agree. USAID has officially adopted the platter of options approach because this is what we found to be most effective. Furthermore, we have also learned that have a rapid water quality test available is important as demonstrating the H2S really motivated people to change their behaviour. These lessons were learned as part of a recent project, which you can read more about at at: http://blogs.washplus.org/drinkingwaterupdates/2012/01/usaidpouzn-public-private-partnership-model-for-point-of-use-water-disinfection/.

Q. Annalise Grobler, Aqua Salveo: *Our firm has experience regarding product certification. South Africa offers a certification for product quality regarding water safety. The certification is recognised in over 140 counties, but oddly, no other African country has adopted the guidelines used by South Africa.*

A. Maggie Montgomery, WHO: We would love to hear from you more about your experience in South Africa. Perhaps this is something you can share with the Network.

5. Discussion on commitments

As part of the World Water Forum activities, the Forum's organizing committee issued an "open invitation to all individuals, organizations, institutions, national and local governments, to submit concrete commitments that address the water challenges of today and tomorrow and that foster genuine follow-up to the 6th World Water Forum results." The commitments are being posted on the Forum's website: http://www.worldwaterforum6.org/.

The official list of commitments submitted to the Forum in respect of HWTS is listed in section 3 of this report. This list of commitments was initially drafted by WHO, circulated for written and verbal comment to a group of stakeholders expressing interest in these proceedings, and discussed by conference call prior to being finalised. The organizations involved in this process included 300in6, Antenna Technologies Foundation, Aqua Publica, Centre for Affordable Water & Sanitation Technology, Eawag, Emory University, Global Environment & Technology Foundation, Helioz R&D, Innovations for Poverty Action, Population Services International, Procter & Gamble, UNICEF, University of North Carolina at Chapel Hill, Vestergaard-Frandsen and WASHConsult,

During the HWTS session Mr Chuck Chaitovitz, Principal of the Global Environment & Technology Foundation, moderated an open and informal discussion on advancing the use of HWTS and invited those present to state publicly their planned commitments, contributions and comments on moving forward in the sector. Mr Chaitovitz kicked off the discussion with stating his organization's own commitment.

Chuck Chaitovitz, Global Environment & Technology Foundation

Our organization was an early signatory to the WASH Sustainability Charter, which aims to unify the sector around a common vision and definition for WASH sustainability. He commented that in his opinion, HWTS is one solution in an array of many for improving access to clean water, and that the private sector has an important role to play in delivering profitable and sustainable solutions that can deliver economic growth and

meet development goals. He invited organizations to learn more by visiting http://sustainablewash.org/.

Othniel Habila, UNICEF Ghana:

We have already begun to take a step in the direction I am suggesting regarding product performance on HWTS. But we need to put these together in a coordinated national policy and strategic framework. Post 2015 we are going to be looking at water quality much more seriously. HWTS becomes extremely important from this standpoint.

Sjef Ernes, Aqua for All:

Aqua for All supports any platform that brings options together, brings joint social marketing together, brings financial instruments together, and brings regulation requirements together. Any platform from any actor, we will support with money, advocacy, and with our network. That's a promise.

Annalise Grober, Aqua Salveo:

I'd like to add what the gentleman from Aquatabs said. Our commitment is to keep our price as low as possible to make sure it gets into the hands of the people who really need it for an affordable price.

Representative of Impact Carbon:

We help finance projects to distribute technologies using carbon financing. We've done that with cookstove technologies. But we'd like to bring carbon financing to the water space, in a way that is large and scalable.

Comment from unnamed audience member:

One commitment that is needed is to help existing initiatives in the country level to achieve scale.

Ryan Rowe, The Water Institute at UNC:

As communications lead for the HWTS Network, the Water Institute is committed to offering support to facilitate so-called South-South collaboration. An example of how this could work – you pick an organization in another country with whom you share common experiences, technologies, target populations and we can feature your efforts in the Network's monthly newsletter.

Henk Holtslag, 300in6:

We will have a presentation tomorrow at 3pm in the World Water Forum's "Village of Solutions" on the topic of low-cost options for safe water at the point of use. The presentation is also available online at: http://www.connectinternational.nl/node/446.

Unnamed representative of a Madagascar-based NGO:

We are already doing initiatives in creating ceramic water filters. We have an integrated approach in sanitation and water filters together, and we are committed to going to scale on that.

Sean Furey, Rural Water Supply Network:

As part of the RWSN, we commit to work together as much as possible. We also want to accelerate self-supply, and HWTS is an important part of this. There is also a project with Skat and WaterAid which is about taking technologies to scale. We'd like to explore areas of HWTS, and how can we get good products to the people who need them.

Erica Goedheer, 300in6:

I am prepared to bring my skills in organizing information and bringing people together to help the safe water effort.

Comment from unnamed audience member regarding supply chain issues:

We need to ensure that people who are supplying products in a sustainable way – to help ensure project sustainability (for example half of pumps in Africa are not working anymore).

Maggie Montgomery, World Health Organization:

In regards to safe storage, our unit is working with the Neglected Tropical Diseases Department at WHO to ensure safe water storage and handling is included in the 2012-2020 Global Strategy for Dengue Prevention and Control.

5. Proceedings of Cholera Session

Background

Effective control measures for cholera rely on integrated prevention and response with implementation of long-term and sustainable safe water, sanitation, and hygiene interventions being critical in reducing the impact of cholera and other waterborne diseases. In line with the recent resolution of the 64th World Health Assembly which calls for "implementation of an integrated and comprehensive global approach to cholera control" (WHO, 2011a), the WHO and the Veolia Environnement Foundation have set a 2015 target of developing an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera. Four initial target countries in Central Africa have been selected. Major emphasis will be placed on ensuring long-term sustainability and work was initiated toward this target in 2010. Additional target countries for 2018 will be selected in 2015 and adapted based on the lessons learned in the initial period.

The GAAC

The Global Alliance Against Cholera (GAAC) was established in early 2010 to advocate for a sustainable and integrated approach against the increasing incidence of cholera and other water borne diseases. It represents an integrated effort that combines the provision of potable water, availability of sanitation facilities, and dedicated health education services based on applied epidemiological research, for a sustainable fight against cholera and other untreated water-related diseases. Based upon this integrated methodology, field actions were initiated in the Eastern part of the Democratic Republic of Congo since 2007, and it has since been expanded to other cholera-affected countries. The approach is implemented by national authorities, with the support of corporate partners, international non-governmental organizations, research institutions and multilateral humanitarian agencies.

Session objectives and programme
The cholera session was held on Tuesday, 13 March, 2012 from 14h30-16h30 and was preceded by a side event hosted by the Global Alliance Against Cholera.[4] The sessions brought together a range of stakeholders to discuss a recommended approach to preventing cholera.

The primary objective of the meeting was to outline the evidence for and provide case study examples of the strategy that will be used to achieve Target 1.3.7.

The session programme can be found in Annex 1b.

Presentations and discussions
The session was opened by the Global Alliance Against Cholera and the Veolia Environnement Foundation and followed by a historical overview of cholera by WHO. Several case studies were then presented on integrated approaches to preventing cholera by WHO, Veolia Environnement Foundation, Solidarités International, UNICEF, Action Contre La Faim, Médecins Sans Frontières, WASHConsult, Community-Led Total Sanitation Foundation, and Constellation. Audience and speaker interaction was moderated by the Institute of Social and Preventive Medicine of the University of Geneva. Closing remarks were made by the Global Alliance Against Cholera. Over 150 individuals attended the session from a range of different organizations.[5]

1. Opening remarks on Target 1.3.7

Dr Ibrahim Mayaki, Chairman of the GAAC & Chief Executive Officer of the New Partnership for African Development, and **Dr Thierry Vandevelde, Executive Officer of the Veolia Environnement Foundation**
Dr Mayaki and Dr Vandevelde gave brief opening remarks. Dr Mayaki introduced the session by placing cholera in the broader context of Target 1.3 to improve the health of target populations through water, sanitation, and hygiene. He gave an overview of the GAAC, an International Advisory Group of water, health, and cholera experts whose guidance is based on the enforcement of epidemiological surveillance to identify patterns in the spread of cholera and identification of cholera source zones where epidemics are likely to emerge and preventive measures can be introduced. Dr Mayaki emphasised the importance of adaptive national and international governance systems in making this strategy effective. He advocated that the greatest impact in the fight against cholera will occur only with a multi-sector approach in which all stakeholders communicate and coordinate efforts jointly. Dr Vandevelde thanked Dr Mayaki for his remarks and expressed appreciation to the WHO for inviting Veolia to talk about this issue. Veolia is the co-host of the GAAC and since 2007 has been contributing to the fight against waterborne disease and specifically cholera and remains strongly committed to these efforts. Dr Vandevelde reiterated the need for an integrated approach to WASH interventions.

[4] The recommendations agreed during the side event are posted online at: http://www.choleraalliance.org/wp-content/galleries/TheGlobalAllianceAgainstCholera-recommendations-v4.pdf.
[5] The names of participants attending the cholera session were not recorded.

2. Case study presentations

Dr Claire Lise Chaignat, Cholera history and key challenges

Dr Chaignat, head of the WHO Global Task Force on Cholera, began her presentation by stating how thrilled she was to contribute to strengthening the link between environmental measures, HWTS and the fight against cholera. She said that cholera is a well-known disease and treatment is straightforward, yet preparedness is important. Effective preventive interventions exist, but implementation is difficult because it tends to affect vulnerable populations and relies on targeted investment in infrastructure and lasting behaviour change. Dr Chaignat gave an overview of the history of cholera, which is characterised by its geographic distribution. Latin America successfully controlled cholera in the late 1990s, due in large part to improvements in drinking-water and sanitation infrastructure. Haiti, which was not affected by that outbreak, is still dealing with bringing under control the outbreak which started in 2010 and which is challenged by the environmental conditions. Overall, Africa has had the majority of reported cases, with various hotspots such as Central Africa, Horn of Africa, the Great Lakes Region and Southern and Western Africa. She expressed alarm at a three-fold increase in cases between 2000 and 2011 (as reported to WHO), and called for renewed and increased efforts in a coordinated multi-sectoral approach against the disease. She noted the importance of case management in reducing mortality as well as the targeted use of vaccines where appropriate. However, she said that vaccines should not be considered a magic bullet, but rather as a complement to usually recommended control measures. Although challenging, a multi-sector, coordinated, integrated approach is needed, which would encompass surveillance of key risk factors in order to identify high risk areas and the delivery of multiple interventions in water, sanitation, and hygiene.

Mr Franck Haaser, Epidemiology and WASH approach: Example of Democratic Republic of Congo and **Mr Gregory Bulit, From operational research to action**

Mr Haaser, Director of the Emergency Division at Veolia Environnement Foundation, discussed cholera in the Democratic Republic of Congo, which experienced 14% of all worldwide reported cases in the period 2002 to 2006. He said that one of the main characteristics of cholera is the heterogeneous distribution of the caseload, citing a published study (Mintz & Guerrant, 2009). He outlined institutional progress in cholera prevention which in 2011 resulted in the creation of an inter-ministerial strategy. He shared a case study from South Kivu, in which mapping of the incidence of cholera and infrastructure networks allowed for the development of a master plan and prioritization of high risk areas. Mr Bulit, Water and Sanitation Team Leader at Solidarités International, continued the presentation by providing an overview of a pilot program for integrated health and WASH approach to preventing cholera in Kalemie, DRC. The program involves mapping and geo-coding of the priority areas in a city and enables a quicker and more targeted response effort. Various stakeholders are coordinated to allow for a more consistent message that can be effective in approaching communities. He said that the integrated approach to health and WASH has been efficient at uniting multiple stakeholders on a single ambitious project.

Mr François Bellet, Epidemiology, WASH and Anthropology: Example of the Lake Chad Basin trans-border countries

Mr Bellet, WASH Specialist at UNICEF, spoke in French about a strategy of *bouclier* ("shield") and *coup de poing* ("action") against cholera in the Lake Chad Basin. Shield and action is an emergency response and development approach which emphasises the integration of interventions for maximum impact. Three high-risk trans-border zones between Chad and Cameroon were identified and a committee was set up to monitor capacities and risks in these zones. Cholera response efforts included qualitative research collected through interviews with affected individuals and their families. Data collected allowed for identifying vulnerabilities and appropriate courses of action. Mr Bellet said that the use of common language and terms such as "shield" and "action" had helped improve communication between the various partners and field operations involved in the response.

Dr Jean Lapegue, Holistic approach to cholera: an emergency response and operational research effort in Chad

Dr Lapegue, Water Supply and Sanitation Programme Manager at Action Contre la Faim, discussed how operational research can affect strategic research. Referring to Mr Bellet's presentation on the shield and action approach he said that is planned in advance and covers three areas: an epidemiological study, an anthropological study, and a microbiological study. In this way we can try to predict the epidemic and its path. In Chad, cholera was markedly different in its geographic distribution and exhibited a higher incidence rate in 2011 than in 2010. A primary distinguishing feature of the 2011 epidemic was that it included interpersonal transmission. Other features revealed patterns in the directionality and intensity of the epidemic that provide insight for future prevention strategies. The anthropological aspect of the approach considers social and cultural matters, the burial of victims, population density, and the coverage of water and sanitation infrastructure in prioritizing a zone for placement of the "shield". The resulting insights can yield a more targeted and appropriate approach to hygiene promotion.

Peter Maes, Solution from Rwanda

Mr Maes, Coordinator of the Water, Hygiene and Sanitation Unit at Médecins Sans Frontières, provided a case study from Rwanda. He illustrated the geographic distribution of cholera, which is mainly concentrated in the Cyangugu Province, which experiences 70% of all cases in the country. These cases are further concentrated within just five "Health Centre Zones" in Cyangugu. He cited a study that showed lakeside populations were at much greater risk. He spoke about a multi-disciplinary, four-year (2002-2006), EUR 1.1m project that targeted 100,000 people in these health centre zones. The main activities included improving access to water, point-of-use water treatment, and hygiene promotion, and required coordination from a range of sectors such as transport, nutrition, to implement the project. An operational evaluation of the project indicated that in areas where these preventive activities were conducted, no new cases of cholera emerged. He emphasised that this was not a published study subject to peer review. But he said that the results suggest that a targeted strategy involving multi-disciplinary input appears to make cholera prevention more feasible. Mr Maes said that a DVD documentary has been produced on the project and is available to interested parties.

Jan Heeger, Household water treatment: Examples of Northern Sudan and Somalia

Mr Heeger, Consultant with WASHConsult, began his presentation by affirming the importance of HWTS in the fight against cholera, pointing to recent supporting World Health Assembly

resolutions in this regard (WHO, 2011a; WHO, 2011b) and the recommendation of HWTS as part of UNICEF and WHO's diarrhea control strategy (UNICEF & WHO, 2009). He cautioned that while an integrated approach is recommended we should not ignore the threat of human to human transmission of cholera (Morris, 2011). HWTS as a solution can be fast and relatively inexpensive to roll out and should be targeted to the most vulnerable. Mr Heeger said that tthere are examples of distribution of HWTS during cholera outbreaks where roll out was much faster than improving water supply. He cited published studies on the impact of integrated WASH strategies on diarrheal diseases which included HWTS, hand-washing with soap, and improved sanitation (Esrey, 1996; Pickering, 2012). Uptake can be even more effective with pre-positioning of supplies and introduction of methods to the community in order to create familiarity in the event of an outbreak. Monitoring of correct and consistent use has been established as an important guiding principle for implementation of HWTS.

Dr Kamal Kar, Community-led sanitation: Example of Chad and Kenya

Dr Kar, Chairman of the Community-Led Total Sanitation Foundation, began his presentation by saying that CLTS aims to heighten awareness of the role of inadequate sanitation in contributing to faecal-oral transmission of pathogens and creating a trigger for behaviour change. He said that infrastructure is only part of the solution; behaviour change is the key to success, and compared the wide-spread practice of open defecation in India to the dominance of mobile phones among more than 800 million people. Dr Kar used the colourful analogy of "institutional open defecation" to describe the situation where institutions are not collaborating or coordinating to address this critical problem. Despite this, he said that CLTS has been a great success in Africa, where it is being employed by 34 African countries, and he provided a breakdown of what countries have included it in their national policies or efforts on sanitation. He referred the audience to download a copy of a Water Supply and Sanitation Collaborative Council training package on CLTS from http://www.wsscc.org/node/1482. He also cited the example of the disappearance of cholera in Nyando District, Kenya after the introduction of CLTS and an audience member identifying himself as the Deputy Public Health Officer for that same district corroborated the claim. Dr Kar concluded his presentation by linking CLTS to efforts to reach Millennium Development Goals 4, 5, 6, and 7.

Ms Marlou de Rouw, Cholera competence & Hygiene promotion

Ms de Rouw, Founding Member of Constellation, a group of individuals, communities, and organizations focused on developing community competence, discussed their work in developing competence in cholera prevention. Their model has been applied to a variety of development issues, and they have worked on WaSH issues in the DRC, Suriname, and Guyana. They focus on what communities can achieve by themselves using a five-step empowerment and change process called the Community Life Competence Process. She said that this model is driven by the need for local ownership of the cholera response in order to maximise effectiveness of prevention, care, and risk mitigation. Ms de Rouw invited the audience to visit Constellation's website at www.communitylifecompetence.org.

Dr Thierry Vandevelde, Global Alliance Against Cholera: International advocacy based on the integrated approach

Dr Vandevelde, Executive Officer at the Veolia Environnement Foundation, gave an overview of the Global Alliance Against Cholera. He asked the audience why we are still struggling with

cholera even today in the 21st century. He asked what it will take to find a solution that works to end the scourge. He summarised the previous discussions and applauded the work reported by MSF from Rwanda. He said that organizations are implementing programmes that deliver results, using an integrated approach that has been proven to be effective. He summarised the discussions by outlining the recommendations to achieve Target 1.3.7.

3. Question & answer session

Q. Unnamed audience member: *Hi Kamal. I would like to offer some testimony on the use of CLTS. We used that method in Chad recently. It was at first difficult to implement in the villages. We started with five or six villages and now we have 30 villages as the model has worked so well. So, thank you.*

Q. Unnamed audience member: *I think that the presentations we heard are instructive, however we talked about integrated approach but I am not hearing discussion about the physical environment aspects. All of you, you gave us guidelines, orientations, recommendations, orientations, against cholera. You said we know the causes of cholera and how to fight. Here we are talking about the water, sanitation, but not the physical environment – for example Haiti, where trash and urban planning is a real problem. People cite the presence of lakes. Why are lakes sources of cholera? What is the connection between the environment /geography and cholera?*

Q. Unnamed audience member: *Yes, I am very interested in what I heard today. But I have an issue I would like to raise. No matter how hard we try, I believe that cholera epidemics will always occur for a simple reason. As we know, the history of cholera has been a spider web throughout the centuries. Then we had a sanitary awakening, a hygiene movement beginning in the 19th century. Now we have over 100 years of history of understanding the need for good hygiene. Looking back in the 1920s, a good example is the surveillance of boats on lakes by the hygiene and sanitation service. If the boats were found to have cholera, they were quarantined. We seem to have forgotten about the importance of hygiene codes. In Africa they have disappeared since the 1970s. They sit in drawers and are not applied nor implemented. I hope in the future in your recommendations you will underline the importance of hygiene codes. Today, we have too few hygiene inspectors and a lack of preventive health policies.*

Q. Wedela Ashid, Morocco: *I'd like to add my testimony that when people suffer from cholera, it is possible to eradicate it. We saw that in 1960. At the Alma Ata conference we considered that drinkable water should be included in health care programmes. And recently we announced the right to drinkable water as a human right. So if we have in mind those rights, is cholera, or access to drinkable water an individual responsibility, or a government responsibility? Well, of course the individual is responsible, he has to wash his hands and so forth, and that's a reasonable thing to expect. But what about allowing people to expect safe drinking water as a government responsibility?*

Q. Unnamed audience member: *I have a question for Dr Kamal. It is true that CLTS is an approach which is better suited in areas suitable to traditional dug latrines. However if we look*

at the lake areas where we have surface water feeding the supply of drinking water, when the toilets have been set up, if there is a flood, could it be spreading disease?

Q. Alie Eleveld, Safe Water and AIDS Project – Kenya: *Hand-washing with soap is a leading intervention in the fight against diarrheal disease but we still see limited supply in many areas. What can we do to ensure a constant supply of soap?*

A. Jean Lapegue: On the question of geography and environment – in 2010 the international prize of Stockholm was given to Rita Colwell for cholera because she saw the correlation between cholera and the temperature of surface waters. If you follow the temperate through satellite imagery, you could potentially predict cholera epidemics. There is a way to anticipate epidemics but it cannot be done in every country because it is a very complicated analysis. Today we only had time for an overview but indeed there are some specific country-level studies that link the environment to cholera epidemics.

A. Kamal Kar: Regarding the question of CLTS near lake-side communities and the issue of floods, surface run-off, etc in consolidated areas - the CLTS method is still okay in these situations, but you have to tailor the approach for local issues. For example, Lake Malawi experiences the issue you speak of. The fishermen arrive during the fishing season and there is often conflict between the residents who live around the lake and the migrants who have no other option but to openly defecate. Fecal matter then ends up in the environment, contaminating drinking-water and fields. But the practice of CLTS has now spread around the lake communities and has helped to contain these outbreaks. If you are interested, you can talk to UNICEF Malawi or Plan International about this progress. Of course, regarding introduction of solid and human waste into the lake, the community cannot do everything. But if you are talking about the natural geography with people in it, the government needs to intervene to address issues like this. Concerning the question on access to drinking water – in Accra City, the speed with which cholera spread was far faster than it had spread ten years before. Access to water is increasing at a faster rate than sanitation, and as a result, there is more water that can become contaminated for more people. Sanitation is critical to reduce diarrheal disease.

A. Ibrahim Mayaki: There are three actors that are necessary to the solution. The first actor consists of the technical experts. There is a vast body of literature which has been produced by experts on technical solutions to development problems. If we were to ask ourselves what we are lacking regarding technical solutions, it would be very difficult to pinpoint what is missing.

The second actor is the government. It is obvious that in a context of low strategic capacity we cannot have a proper institutional response to the problem. The role of the government in managing infrastructure is essential. In Africa, infrastructure is not financed by the private sector, 90% of the volumes in financing come from the public sector.

The third actor – communities – is the key building block of efficiency. This is simply because solutions cannot be forced upon populations. One needs to encourage

communities to claim ownership on solutions, if they can claim this ownership they will be more willing to change. For example, if we have a hygiene code defined by technocrats and that is disseminated through an education and awareness campaign but the institutional infrastructure to enforce or monitor it does not exist, then the code might as well remain in a drawer. Communities need to be involved in generating solutions. We risk working in a vicious circle if we don't have the bottom line in mind.

A. Peter Maes: On the role of the government, one of the names given to cholera is the great sanitary reformer. As we know it was the cholera outbreaks in UK that provoked governments to invest in water and sanitation infrastructure. The notion that you cannot put the whole role of infrastructure provision on the shoulders of government should be underlined.

A. Jean Lapegue: In answer to the question of responsibility I have three comments. Of course the government is responsible for the population – this is the precise definition of government. Secondly, most people dying of cholera are under the age of five, so of course they cannot and do not have any responsibility for their own health. Thirdly, the right to water is a nice tool but if it is not integrated within institutions then it will be completely ineffective.

A. An audience member identified himself as the Deputy Public Health Officer for Nyando District, Kenya: Our area of Kenya was a hot spot of cholera the last couple of years, although there is no cholera there now. I agree that an integrated approach is the way forward. And to the lady who asked about free soap, we need to look for innovations that involve non-traditional stakeholders such as corporate partners.

During the Q&A session, a brief video was played to highlight the work of the GAAC, which has three key activities: epidemiological studies, field assessments, and consolidation of the results of the first two steps into a master plan. More information about the GAAC is available at http://www.choleraalliance.org/.

4. Closing remarks by Dr Ibrahim Mayaki

Dr Mayaki thanked the panel members and the audience for the vibrant discussion and interaction. He said that as a group of stakeholders focused on preventing cholera we must focus on adopting an integrated approach as this is essential for sustainability. He said that there is a need to take measures beyond just a response to outbreaks. The first step is to have a common strategic plan that brings together experts, government, and communities for its execution. Governance of this plan is a critical success factor: across technical, managerial, and institutional dimensions. All stakeholders must be held accountable for preparedness, action, and resourcing.

6. Overall Conclusions and Next Steps

The activities and processes in place to meet the targets established for both HWTS and cholera will continue under the umbrella of the Network and the GAAC, respectively. Effectively reducing cholera and diarrheal diseases more generally will require a strong focus on prevention through safe drinking-water, sanitation and hygiene. As highlighted during these sessions, emphasis will be placed on developing coordinated action plans, integrating water and health

efforts, targeting HWTS to those most at risk, improving the rigour of monitoring and evaluation, and developing and implementing national policies incentives to facilitate scaling-up HWTS. This will require greater coordination with the health sector, clear standards and regulations, innovative financing, and a greater emphasis on the importance of correct and consistent use.

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Annex 1a: Programme of HWTS session

1.3.6 Increasing Scale and Impact of Household Water Treatment and Safe Storage through National Policy Support, Development and Implementation

World Health Organisation (WHO)

1.3.6. By 2015, 30 additional countries will have established national policies and/or regulations regarding household water treatment and safe storage; by 2018, 50 countries will have reached this target; the scale-up process will be based on a gradual and measurable increase of sound evidence of the public health benefits of this approach.

Low-cost interventions for household-based treatment of drinking-water and safe storage can significantly reduce the pathogen load in drinking-water and, thereby, reduce the risk of diarrhoeal diseases. Achieving tangible results in the scaling-up of household water treatment and safe storage (HWTS) depends, in large part, on national enabling environments and supportive national policies. International targets on establishing national HWTS policies have been articulated in the Strategy of the International Network on Household Water Treatment and Safe Storage and have been adopted by the relevant World Water Forum 2012 working group.
This session will focus on the importance of these policies, links to implementation and the role of all key stakeholders in informing and supporting effective policy development.

Programme:

5' **Opening remarks regarding target and links to strategy of the International Network on Household Water Treatment and Safe Storage**
- Margaret MONTGOMERY - Technical Officer Water, Sanitation, Hygiene and Health (WHO)

40' **Presentations on HWTS as a proven health intervention and selected solutions**
- Lilian LEHMAN - Global Programs Manager (Innovations for Poverty Action)
- Alie ELEVELD - Program Director (Safe Water and Aid Project)
- Martina PODEPREL - CCO (Helioz R&D)
- Regula MEIERHOFER - Director (Eawag)
- Jan HEEGER - Director (Emergency Wat/san Consultancy)

20' **Importance of national policies for scaling-up HWTS: experience from selected countries, including Thailand and the Democratic Republic of Congo**
- Suree WONGPIYACHON - Director Bureau of Food and Water Sanitation (Department of Health - Thailand)
- Pierre LOKADI - General Secretary (Ministry of Public Health, Democratic Republic of Congo)

35' **Panel on linking policy to implementation and HWTS solutions (policy development, integration with health programmes, regulation, M&E/research)**
- Alie ELEVELD - Program Director (Safe Water and Aid Project)
- Navneet GARG - Chief Development Officer (Vestergaard Frandsen)
- Kevin O'CALLAGHAN - Sales and Marketing Manager (Medentech)
- Regula MEIERHOFER - Director (Eawag)
- Suree WONGPIYACHON - Director Bureau of Food and Water Sanitation (Department of Health - Thailand)
- Merri WEINGER - Programme Manager Hygiene Improvement (USAID)

15' **Brainstorming for an harmonized list of priority commitments**
- Moderated by Chuck CHAITOVITZ - Principal (Global Environment and Technology Foundation)

1.3.6 Accroître le déploiement et l'impact du traitement et de la bonne conservation de l'eau à domicile grâce à l'appui, au développement, et à la mise en œuvre de politiques nationales

Organisation mondiale de la santé (OMS)

1.3.6. D'ici à 2015, 30 pays supplémentaires auront établi des politiques nationales et/ou des réglementations concernant le traitement et la bonne conservation de l'eau à domicile ; d'ici à 2018, 50 pays auront atteint cet objectif-cible ; le processus d'intensification sera basé sur une augmentation progressive et sensible des preuves démontrant les avantages de cette approche en terme de santé publique

La pratique d'interventions peu coûteuses pour assurer le traitement et la bonne conservation de l'eau potable à domicile peut permettre de réduire de manière significative la charge pathogène contenue dans l'eau potable et, par là-même, de réduire le risque de contracter des maladies diarrhéiques. L'obtention de résultats tangibles dans le déploiement du traitement et de la bonne conservation de l'eau à domicile (household water treatment and safe storage, HWTS) dépend, en grande partie, de la mise en place de conditions favorables et de programmes de soutien au niveau national. Les objectifs internationaux relatifs à l'établissement de politiques nationales de traitement et de bonne conservation de l'eau à domicile ont été énoncés dans la Stratégie du Réseau international sur le traitement et la bonne conservation de l'eau à domicile, et ont été adoptés par le groupe de travail associé du Forum Mondial de l'Eau de 2012. Cette session mettra l'accent sur l'importance de ces politiques, sur les liens menant à leur mise en œuvre, et sur le rôle de l'ensemble des principales parties prenantes dans l'information et dans le soutien à la mise au point de politiques efficaces.

Programme:

5' **Introduction à l'objectif-cible en lien avec la stratégie du Réseau international sur le traitement et la conservation de l'eau à domicile (HWTS)**
- Margaret MONTGOMERY - Technical Officer Water, Sanitation, Hygiene and Health (WHO)

40' **Présentations sur HWTS comme une intervention de santé probante et sur les solutions choisies**
- Lilian LEHMAN - Global Programs Manager (Innovations for Poverty Action)
- Alie ELEVELD - Program Director (Safe Water and Aid Project)
- Martina PODEPREL - CCO (Helioz R&D)
- Regula MEIERHOFER - Director (Eawag)
- Jan HEEGER - Director (Emergency Wat/san Consultancy)

20' **L'importance des politiques nationales pour déployer HWTS: experiences de plusieurs pays, dont la Thailande et la République Démocratique du Congo**
- Suree WONGPIYACHON - Director Bureau of Food and Water Sanitation (Department of Health - Thailand)
- Pierre LOKADI - General Secretary (Ministry of Public Health, Democratic Republic of Congo)

35' **Panel sur le lien entre politiques et mise en oeuvre et les solutions HWTS (politiques publiques, intégration avec les campagnes de santé publique, régulation, M&E/recherche)**
- Alie ELEVELD - Program Director (Safe Water and Aid Project)
- Navneet GARG - Chief Development Officer (Vestergaard Frandsen)
- Kevin O'CALLAGHAN - Sales and Marketing Manager (Medentech)
- Regula MEIERHOFER - Director (Eawag)
- Suree WONGPIYACHON - Director Bureau of Food and Water Sanitation (Department of Health - Thailand)
- Merri WEINGER - Programme Manager Hygiene Improvement (USAID)

15' **Echanges pour une liste harmonisée d'engagements prioritaires**
- Moderated by Chuck CHAITOVITZ - Principal (Global Environment and Technology Foundation)

Annex 1b: Programme of Cholera session

1.3.7 Why are people still dying of cholera today: What practical solutions could we suggest?

World Health Organisation (WHO), Veolia Foundation

1.3.7. By 2015 an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera will have been anchored in 4 countries of Central Africa, with a major emphasis on ensuring sustainability through water and sanitation infrastructure development. By 2018, this approach will have been replicated in additional African high cholera incidence countries, pending on the ongoing cholera situation in 2015.

Each year, cholera claims thousands of lives. In 2010, there were more than 7,500 deaths out of over 300,000 cases. These figures have been rising steadily since 2000. Developing countries have been the hardest hit. Apart from the recent epidemic in Hispaniola, Africa accounts for over 80% of cases declared worldwide, with outbreaks revealing areas of recurrent waterborne diarrhoeal diseases. Yet known solutions exist to prevent and properly manage these illnesses. Development of water and sanitation infrastructure and improvement in hygiene practices enabled some regions to eliminate these epidemics by the 20th century.

Why are people still dying of cholera in 2012? What responsibilities should we take on in the areas of water, sanitation, and hygiene to combat this scourge, and how can they be expressed in consistent control strategies?

Programme:

5' **Introduction of the target**
- Ibrahim MAYAKI - Chair (Global Alliance Against Cholera (GAAC))

65' **Case studies presentations:**
- Cholera history and key challenges, Claire-Lise CHAIGNAT - Head WHO Global Task Force on Cholera (WHO)
- Epidemiology and WASH approach: Example of Democratic Republic of Congo, Franck HAASER - Director Emergency Division (Veolia Environment Foundation)
- Gregory BULIT - Water and Sanitation Team Leader (Solidarites International)
- Epidemiology, WASH and Anthropology: Example of the Lake Chad Basin trans-border countries, François BELLET - WASH Specialist (UNICEF)
- Julien EYRARD - WaSH Adviser (Action Contre la Faim)
- Solution from Rwanda, Peter MAES - Coordinator Water, Hygiene and Sanitation Unit (MSF)
- Household water treatment: Example of Northern Sudan and Somalia, Jan HEEGER - WASH Consultant (UNICEF)
- Maggie MONTGOMERY,Technical Officer Water, Sanitation, Hygiene and Health (WHO)
- Community-led sanitation: Example of Chad and Kenya, Kamal KAR (Community Lead Total Sanitation Foundation)
- Cholera competence & Hygiene promotion, Marlou DE ROUW (Community Life Competence)
- Global Alliance Against Cholera: International advocacy based on the integrated approach, Thierry VANDEVELDE - Executive Officer (VEF)

35' **Q&A/Debate with the audience**
- Beat STOLL - Coordinator (Institute of Social and Preventive Medicine)

15' **Conclusions and recommendations**

1.3.7 Pourquoi meurt-on encore du choléra aujourd'hui : quelles solutions pratiques apporter ?

Organisation mondiale de la santé (OMS), Fondation Véolia Environnement

1.3.7. D'ici à 2015, une approche intégrée basée sur des preuves solides concernant la prévention primaire de l'endémie et de l'épidémie de choléra aura été mise en place dans 4 pays d'Afrique centrale, avec un accent particulier sur la durabilité grâce au développement des infrastructures liées à l'eau et l'assainissement. D'ici à 2018, cette approche aura été reproduite dans d'autres pays africains fortement affectés par le choléra, en fonction de la situation épidémiologique en 2015.

Chaque année, le choléra fait des milliers de victimes. En 2010, sur plus de 300.000 cas, plus de 7 500 ont été mortels. Ces chiffres augmentent constamment depuis 2000. Les pays en développement paient le plus lourd tribut. A l'exception de la récente épidémie d'Hispaniola, l'Afrique compte plus de 80% des cas mondiaux déclarés, avec des flambées révélant les terrains où sévissent les maladies diarrhéiques d'origine hydrique de façon récurrente. Des solutions connues existent pourtant pour prévenir et prendre en charge correctement ces maladies. Le développement des infrastructures d'eau, d'assainissement et l'amélioration des pratiques d'hygiène a permis à certaines régions de s'affranchir de ces épidémies dès le XXème siècle. Pourquoi meurt-on encore du choléra en 2012 ?

Quelles sont les responsabilités à assurer dans les domaines de l'eau, l'assainissement et l'hygiène pour lutter contre le fléau et comment les articuler dans des stratégies cohérentes de lutte ?

Programme:

5' **Introduction à l'objectif-cible**
- Ibrahim MAYAKI - Chair (Global Alliance Against Cholera (GAAC))

65' **Présentation d'études de cas:**
- Histoire du choléra et défis majeurs, Claire-Lise CHAIGNAT - Head WHO Global Task Force on Cholera (WHO)
- Epidémiologie l'approche EAH: l'exemple de la République Démocratique du Congo, Franck HAASER - Director Emergency Division (Veolia Environment Foundation)
- Gregory BULIT - Water and Sanitation Team Leader (Solidarites International)
- Epidémiologie, EAH et anthropologie: exemple des pays riverains du bassin du lac Tchad, François BELLET - WASH Specialist (UNICEF)
- Julien EYRARD - WaSH Adviser (Action Contre la Faim)
- Solution du Rwanda, Peter MAES - Coordinator Water, Hygiene and Sanitation Unit (MSF)
- Le traitement domestique de l'eau: Exemples du Nord-Soudan et de la Somalie, Jan HEEGER - WASH Consultant (UNICEF)
- Maggie MONTGOMERY, Technical Officer Water, Sanitation, Hygiene and Health (WHO)
- L'assainissement par les communautés: Exemples du Tchad et du Kenya, Kamal KAR (Community Lead Total Sanitation Foundation)
- Les compétences pour le cholera & la promotion de l'hygiène, Marlou DE ROUW (Community Life Competence)
- L'alliance mondiale contre le choléra: une mobilisation internationale fondée sur une approche intégrée, Thierry VANDEVELDE - Executive Officer (VEF)

35' **Questions et réponses – débat avec le public**
- Beat STOLL - Coordinator (Institute of Social and Preventive Medicine)

15' **Conclusions et recommandations**

Annex 2a: Overview of HWTS session

Target and Solutions Group Household Water Treatment and Safe Storage

Thematic Priority 1.3, Target 6

Session proposal on the target, its action plan, its identified solutions and commitments and the related Forum session

Introduction

The burden of diarrhoeal diseases is largely borne by developing countries and drains vital resources from impoverished economies. Approximately 88% of diarrhoea cases worldwide are attributable to unsafe drinking water, inadequate sanitation or insufficient hygiene. According to most recent estimates available, in 2004, these cases resulted in 1.9 million deaths, the majority of which affect children under the age of five[1]. After pneumonia, diarrhea is the second leading cause of death among young children[2]. Drinking-water contaminated by the bacterial, viral, or protozoan pathogens is a primary transmission route for diarrhoeal disease.

The treatment and safe storage of drinking-water at the household level (household water treatment and safe storage - HWTS) has significant potential to reduce the burden of diarrhoeal disease and improve survival of vulnerable populations, such as young children. The WHO/UNICEF Joint Monitoring Programme does not include drinking-water that has undergone household treatment in its definition of improved water sources. Therefore, it is not considered a replacement for the sustainable supply of safe drinking-water. Yet, household water treatment and safe storage address a real need in conditions where people lack access to improved sources of drinking-water (globally an estimated 884 million people[3]), where water quality is jeopardized at the source or point of use by poor hygiene or where storage is necessary because of the unreliability of drinking-water supplies. Household water treatment will become increasingly important in water-scarce situations. The importance of safe storage will similarly increase in parts of the world where reliance on rainwater harvesting expands. Both issues are also critically important in the context of emergencies and humanitarian crises.

While point of use (POU) is another term used to represent water treated just prior to consumption throughout this session proposal the term HWTS is used. It refers not only to drinking-water treated in the home but also in schools, health care settings and other community locations. In addition, it may include water that is treated by small-scale vendors before selling at the household level.

Background and Rationale

The basis for advocating for HWTS national policies and scaling-up is supported by several evidence and consensus-based priorities and documents. For example, the 7-point strategy for comprehensive diarrhoea control, adopted by UNICEF and WHO[4], includes HWTS as a proven intervention to reduce child mortality and HWTS was given the highest rating among essential prevention and care interventions for HIV[5].

As an intervention, household water treatment and safe storage have proved to be cost-effective in low-income settings. It has been estimated that 1 USD invested into household

[1] WHO. Global estimates of burden of disease caused by environmental risks. http://www.who.int/quantifying_ehimpacts/global/globalwater2004/en/index.html

[2] Black, et al. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *The Lancet*, 375 2010:1969-1987.

[3] WHO/UNICEF (2010). *Progress on sanitation and drinking water 2010 update.* Geneva: World Health Organization, New York: United Nations Children's Fund.

[4] UNICEF/WHO (2009). *Why children are still dying and what can be done.* Geneva: World Health Organization. http://whqlibdoc.who.int/publications/2009/9789241598415_eng.pdf

[5] WHO (2008). *Essential prevention and care interventions for adults and adolescents living with HIV in resource-limited settings*. Geneva: World Health Organization. http://www.who.int/hiv/pub/guidelines/EP/en/index.html

water intervention can lead to as much as a 60-fold benefit[6]. In a broader perspective, the World Bank has found that an integrated approach to environmental health interventions comprising a reduction of indoor air pollution, the distribution of insecticide-treated mosquito nets and point-of-use water treatment could make a major impact on poverty reduction[7,8]. Therefore, it is important that household water treatment and safe storage interventions are delivered in an integrated and contextual manner. The goal should be to promote HWTS as part of the delivery of a combination of interventions for environmental health challenges at the household level.

In light of the above benefits and in order to promote increased use of HWTS, the International Network on Household Water Treatment and Safe Storage (the Network) was established by WHO in 2003. The Network brings together a range of stakeholders who are committed to the network's mission *to contribute to a significant reduction in water-borne and water-related vector-borne diseases, especially among vulnerable populations, by promoting household water treatment and safe storage as a key component of community-targeted environmental health programmes.* Starting in 2011, UNICEF joined WHO as a Network co-host. In this same year an Advisory Group, Public-Private Partnership Group, and four working groups were established to carry out the activity in the four main areas of Network focus: research, implementation and scaling up, creating an enabling environment, and monitoring and evaluation.

Achieving tangible results in the scaling-up of HWTS and integration into critical public health programmes depends, in large part, on national enabling environments and policies. National policies on HWTS are important for many reasons including to facilitate the use of HWTS among vulnerable populations and to increase coordination of those working to implement and sustain HWTS. International targets on establishing national HWTS policies have been articulated in the Strategy of the International Network on Household Water Treatment and Safe Storage[9]. These same targets have been adopted by the World Water Forum 2012 and will serve the basis for the HWTS session.

Target Action Plan
(See attached document).

Solutions

The solutions for achieving this target are multifaceted and involved a wide range of stakeholders. The Network working groups and contributions from Network participating organizations will serve as the primary means by which to generate and share such solutions. An overview of these solutions is as follows:

- Technical support for developing/strengthening national policies and regulations
    - Webinars (Network participating organizations, WHO and UNICEF HWTS training modules)
    - National and regional workshops (Network)

[6] Hutton G and Haller L (2004). "Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level." Water, Sanitation and Health Protection of the Human Environment, World Health Organization, Geneva WHO/SDE/WSH/04.04

[7] Harou, Patrice and Fadi Doumani, Editors (1998). *Environmental Economics for Development Policy Manual* WBIEN. Washington, D.C.: The World Bank.

[8] Shyamsundar P (2002)"Poverty- Environment Indicators". *Environmental Economics Series*. No 84. Washington DC: The World Bank Environment Department

[9] WHO/UNICEF (2011). *International Network on Household Water Treatment and Safe Storage. Funding and Strategy Proposa*http://www.who.int/household_water/resources/NetworkStrategyMar2011.pdf

    - Dissemination and implementation of guidance documents (i.e. WHO "Evaluating household water treatment options: health-based targets and microbiological performance options)
- National policy implementation support
    - Framework for selecting most appropriate HWT options for a particular population and environmental situations
    - Monitoring and evaluation framework and indicators
    - Recommendations on sustaining correct and consistent use
- Raising awareness on importance of policy and policy implementation for achieving scale and impact
    - Support in establishing national HWTS working groups
    - Development of advocacy notes for use by policy-makers and advocates of HWTS
    - "Spotlight" country progress on HWTS policies (for example, through Newsletter and events of International Network on Household Water Treatment and Safe Storage)
    - Advocacy by HWTS implementers on importance of policy in their own projects
- Monitoring of use of HWTS and extent to which scale-up is achieved and benefits are realized
    - Completion and implementation of WHO/UNICEF Toolkit on Monitoring and Evaluation of Household Water Treatment and Safe Storage
    - Integration of indicators from above named toolkit into national surveys, censuses and other existing data collection efforts
    - Ongoing data collection, analysis and dissemination

Recommendations for Follow-up

The solutions will be worked on both prior and after the World Water Forum. The four Network working groups (advocacy/policy, research/knowledge management, implementation/integration and scale-up, and monitoring and mapping), each of which are lead by co-conveners, will serve an important role in completing this work. While the HWTS target is directly related to the advocacy/policy group, the other groups are working on deliverables that will help inform policy development, assess the effect of national policies, and increase understanding, information exchange and collaborations between government officials, implementers and donors.

Conclusion

It has been shown that HWTS is an effective measure for preventing diarrhoeal disease and improving health. In order to realize the benefits of HWTS targeted and wide-scale implementation is needed. Such implementation depends on clear and coordinated national policies, especially those that link HWTS to other health interventions. It is hoped that by focusing efforts on achieving this target greater and more effective use of HWTS will be achieved.

Annex 2b: Overview of Cholera session

6th World Water Forum Template

Target & Solutions Group Session Proposal

1.3.: Contribute to improve hygiene and health through water and sanitation

1.3.7.: By 2015 an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera will have been anchored in 4 countries of Central Africa, with a major emphasis on ensuring sustainability through water and sanitation infrastructure development. By 2018, this approach will have been replicated in additional African high cholera incidence countries, pending on the ongoing cholera situation in 2015.

Coordinator: Claire-Lise CHAIGNAT, Global Task Force on Cholera Control, World Health Organization

Co-coordinator: Thierry VANDEVELDE, Global Alliance Against Cholera & Veolia Environnement Foundation

1. Introduction

"During the 19th century, cholera spread across the world from its original reservoir in the Ganges delta in India. Six subsequent pandemics killed millions of people across all continents. The current seventh pandemic started in South Asia in 1961, and reached Africa in 1971 and the Americas in 1991."[1]

Since 2000, Africa remains the first continent affected by cholera, a rapidly dehydrating acute diarrhoeal disease, representing 98% of total declared cases worldwide reported during 2001-2009.

Cholera outbreaks are caused by two serogroups: *Vibrio cholerae*: O1 and O139. *V. cholerae* O1 causes the majority of outbreaks, notably in Africa, while O139 (first identified in Bangladesh in 1992) is confined to South-East Asia. "The main reservoirs of *V. cholerae* are people and aquatic sources such as brackish water and estuaries, often associated with algal blooms. Recent studies indicate that global warming creates a favourable environment for the bacteria."[2]

Cholera transmission is closely linked to low hygiene as welll as to inadequate environmental management such as lack of access to drinking water and proper sanitation infrastructures. Minimum hygiene and vital needs requirements are not met in typical at-risk areas, which is a key indicator for the lack of social development.

Cholera remains a global threat to public health. The recent re-emergence of cholera is directly linked to the ever-increasing number of vulnerable people living in unsanitary conditions. Moreover, usual expectations in the fight against cholera are based upon short term outbreak responses offered through Cholera Treatment Centres, and curative medicine. It is however clear that a new strategy to control this disease, and not just continuing to responding to its outbreaks, is needed.

Key information:

- Cholera is an acute diarrhoeal disease that can kill within hours if left untreated.
- There are an estimated 3–5 million cholera cases and 100 000–120 000 deaths due to cholera every year[3]. The short incubation period of a few hours to five days, enhances the potentially explosive pattern of outbreaks.
- Effective control measures rely on integrated prevention and response with provision of safe water, sanitation and hygiene is critical in reducing the impact of cholera and other waterborne diseases.

[1] Source: World Health Organisation
[2] Source: World Health Organisation
[3] Source: World Health Organisation

2. Background and rationale of the target

The 6th World Water Forum is named as the Forum of Solutions. The aim of the designated core group 1.3 is to improve the health of target populations through enhanced hygiene and improved access to water and sanitation. Target 1.3.7. will focus on cholera.

Cholera is a water-borne disease, potentially lethal if left untreated. A clear correlation has been drawn by researchers between cholera epidemics and limited access to safe water and sanitation.

In a context of recent re-emergence of cholera in Africa, representing the majority of world cholera cases, it is our mission to find innovative solutions to control cholera in affected countries.

Since several decades, cholera is taking its grip in Africa, with frequent epidemic peaks often dealt with as emergencies. However, the occurrence of the disease can be prevented with longer term solutions. Therefore, in line with the recent resolution of World Health Assembly 64 (2011) who calls for "implementation of an integrated and comprehensive global approach to cholera control", the World Health Organisation (WHO) and the Global Alliance Against Cholera (GAAC) aim at presenting evidence-based solutions, going far beyond the sole emergency response.

More precisely, by 2015 an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera will have been anchored in 4 cholera endemic countries of Central Africa including Chad, Cameroon, Nigeria and Niger. Major emphasis will be put on ensuring sustainability through developing the water and sanitation infrastructure, as part of a multidisciplinary approach. Epidemiological and water and sanitation evaluations were already initiated in 2010.

Solutions presented to illustrate the proposed target are project examples already implemented in different countries during past years by several international partners such as UNICEF, WHO, MSF, Veolia Environnement Foundation, and others.

One of the solutions proposed will be the national program for the 'fight against cholera', that has been implemented in the Democratic Republic of Congo since 2007. The particularity of this program is its methodology developed to strengthen and secure sustainable access to safe water, sanitation, and hygiene. Epidemiological studies were first initiated to better understand cholera trends, to identify "hot spots" where to undertake water and sanitation studies and interventions. The parallel drawn between environmental and epidemiological surveillance allowed a scientifically-based cholera risk mapping and definition of W.A.S.H. master plans for each of the identified hot spots. The methodology was adopted by the Congolese Ministry of Health and is now part of the national cholera control strategy, with the aim to address the root cause of cholera occurrence.

Similarly, other concrete examples from other countries will be presented to support the target.

Additional target countries for 2018 will be selected in 2015, leaving time to adapt interventions to the progress achieved through interventions against cholera over the coming three years. These will allow identifying lessons learned and scaling up activities for other cholera affected regions.

3. Target action plan and commitments

KEY STEPS	IMPLEMENTATION/ MONITORING	DEADLINE	LEAD INSTITUTION	PARTNERS	KEY REQUIREMENTS
Objective 1: By 2015 an evidence-based integrated approach for the primary prevention of endemic and epidemic cholera will have been anchored in 4 countries of Central Africa (Chad, Cameroon, Nigeria and Niger), with a major emphasis on ensuring sustainability through water and sanitation infrastructure development.					
Involvement in the 6th World Water Forum	Coordination of a session on the fight against cholera	March 2012	WHO, Veolia Environnement Foundation, Global Alliance Against Cholera	Solidarités International, UNICEF, Congolese Authorities, Action contre la Faim, Médecins Sans Frontières, Community Life Competency	- Good lead and preparation of the session - Relevant and achievable recommendations made during the forum
Implementation of concrete actions in the 4 countries, with a trans-border cooperation	*Not yet defined*	2015	GAAC, Veolia Environnement Foundation, WHO, UNICEF	Action Contre la Faim, National and local authorities	- Available Funds - Efficient coordination and cooperation
Organisation of an international workshop on integrated cholera response	*Not yet defined*	2013	UNICEF, MSF, WHO, CDC, London School of Tropical Medecine	Veolia Environnement Foundation, GAAC	- Gathering of all actors involved in the fight against cholera - Available Funds
Objective 2: By 2018, the integrated approach will have been replicated in additional African high cholera incidence countries.					
Study: Lessons Learned since 2015	Study on the lessons learned since 2012 and impact study on cholera epidemics	2017	GAAC, Veolia Environnement Foundation, WHO, UNICEF	*Not yet defined*	- Available funds
New cholera integrated programs in these cholera affected countries in Africa	Replication of the integrated approach, considering the lessons learned	2018	GAAC, Veolia Environnement Foundation, WHO, UNICEF	*Not yet defined*	- Available Funds

4. Solutions

The solutions gathered were chosen to show relevant examples of actions for the fight against cholera, to be included in a general integrated approach.

- Solution 1: Epidemiology and WASH approach: Example of Democratic Republic of Congo

The goal of the project is to control cholera epidemics in the Democratic Republic of Congo by supporting local governmental agencies, N.G.O.'s and International organizational efforts to change their traditional cholera response paradigm from treatment to prevention by helping them to strengthen and secure sustainable access to potable water, sanitation, and hygiene for "at risk populations".

As cholera is a diarrhoeal contagious disease whose main vector is contaminated water, a clear correlation has been drawn by researchers between the emergence of cholera epidemics and areas with limited access to potable water.

Therefore, the adopted methodology in the DRC integrates epidemiological studies, and water, sanitation and hygiene assessments, to allow targeted actions.

- Solution 2: Epidemiology, WASH and Anthropology: Example of the Lake Chad Basin trans-border countries with a focus on Chad

- Solution 3: Solution from Rwanda

- Solution 4: Household water treatment: Example of Northern Sudan and Somalia

- Solution 5: Community-led sanitation : Example of Kenya and Chad

- Solution 6: Cholera competence & Hygiene promotion

- Political Solution: Global Alliance Against Cholera: International advocacy based on the integrated approach

The Global Alliance Against Cholera (G.A.A.C.) that includes public, private and international organisations supports the integrated approach for the fight against cholera. The Alliance encourages coordination of individual agency efforts toward a comprehensive approach to preventing the spread of cholera at the community level, and aims at stimulating international fund raising for this cause.

5. Recommendations for follow-up

Recommendation 1:

Adopt and promote an approach integrating Water and Health for a sustainable response to cholera epidemics, including improvement of the water and health systems through enhanced involvement of affected countries' governments.

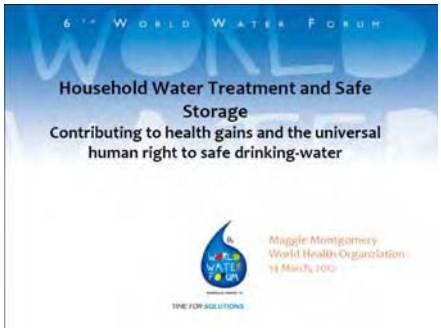
Recommendation 2:

Provide medium and long term prevention and control measures, which go far beyond the sole outbreak response.

Recommendation 3:

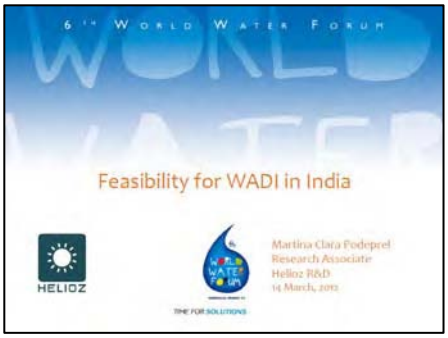
Increase and improve coordination between the water and health sectors to develop operational research leading to improved and sustainable control measures. How to work better together?

Annex 3a: List of presentations from HWTS session



Maggie Montgomery

World Health Organization



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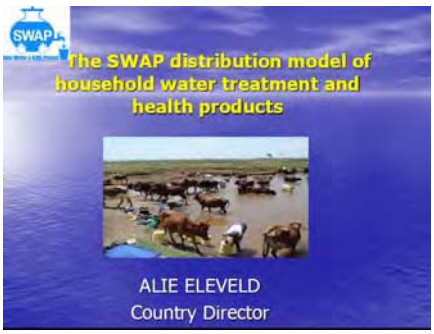
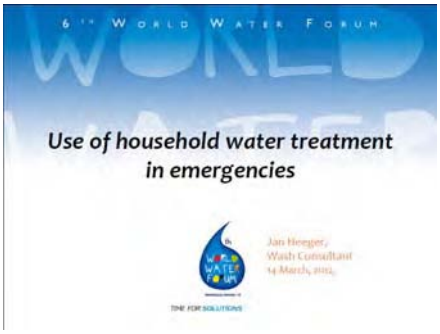
Helioz R&D



Alie Eleveld

Safe Water and AIDS Project



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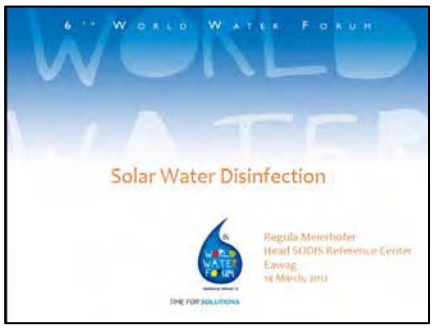
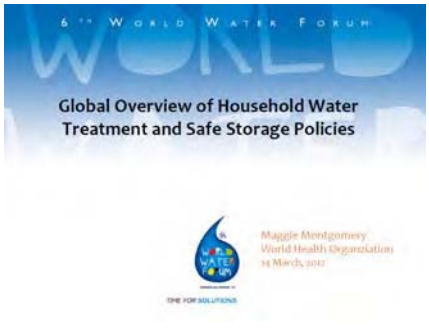
WASHConsult



Regula Meierhofer
SODIS Reference Center, Eawag



Maggie Montgomery

World Health Organization

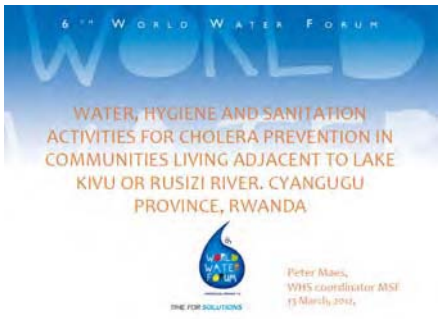
These presentations are available by download from the Network's event website at: http://waterinstitute.unc.edu/hwts.

Annex 3b: List of presentations from Cholera session

Claire-Lise Chagnat
Global Task Force on Cholera,
World Health Organization

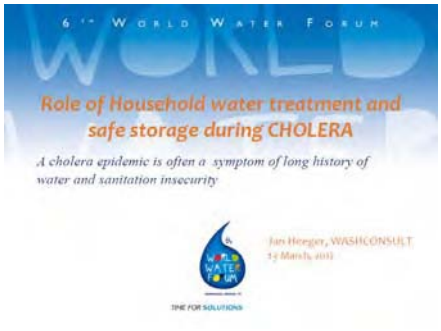
Jean Lapegue
Action Contre la Faim

Franck Haaser, Veolia Environnement Foundation, and **Gregory Bulit, Solidarites International**



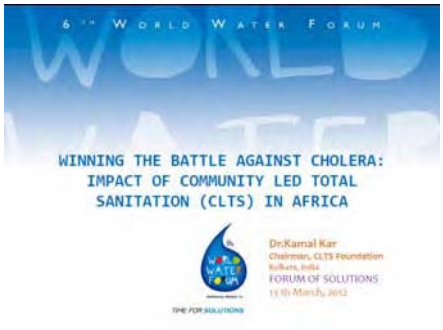
Peter Maes
Médecins Sans Frontières

Francois Bellet
UNICEF

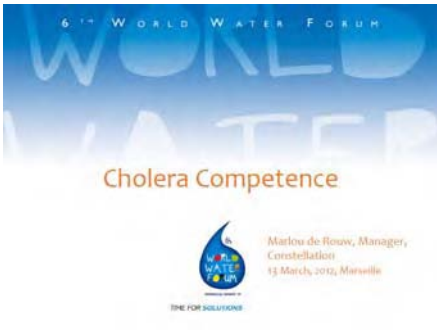


Jan Heeger
WASHConsult

Annex 3b: List of presentations from cholera session (continued)



Kamal Kar
Chairman, Community-led Total Sanitation Foundation



Marlou de Rouw
Founding Member
Constellation

These presentations are available by download from the Network's event website at: http://waterinstitute.unc.edu/hwts.

Annex 4: List of participants from HWTS session

	Name	Organization
1	Agnes Montangero	Helvetas
2	Alejandra Burchard	Tsinghua University
3	Angelika Stadelmann	Helioz R&D
4	Annalise Grober	Aqua Salveo
5	Anthony Akpan	Pan African Vision for the Environment
6	Avinon Wondrueng	University of Tokyo
7	Beverly Pillers	Potters for Peace
8	Latifa Bousselmi	Water Research & Technology Centre of Borj-Cedria (CERTE Tunisie)
9	Carole de Bazignan	Antenna Technologies
10	Chris Cox	Caribbean Environmental Health Institute St-Lucia
11	Chuck Chaitovitz	Global Environment and Technology Foundation
12	Cisser	Societe Malienne de Patrimoine de l'Eau Potable
13	Claire Atrion	Academie de l'Eau
14	Dano Wilusz	Government of United States - Department of State
15	David Rounce	University of Texas
16	Diana Karanja	KEMRI and Community Health Support (COHESU)
17	Edwin Joseph	ONG St Gabriel – Madagascar
18	Emily Smith	Impact Carbon
19	Erica Goedheer	300in6
20	Florence Albe	Ville d'Eybens - France
21	Ahmed Ghrabi	Water Research & Technology Centre of Borj-Cedria (CERTE Tunisie)
22	Henk Holtslag	300in6
23	Jeremy Hand	Innovations for Poverty Action
24	Joe Troester	Evangelical Lutheran Church in America
25	Jud Voort	300in6
26	Kepha Ombacho	Government of Kenya - Ministry of Public Health & Sanitation
27	Kevin O'Callaghan	Medentech
28	Kristof Koch	Government of Switzerland - Federal Department of Foreign Affairs
29	Maggie Montgomery	World Health Organization
30	Marcel van Beer	Vestergaard-Frandsen
31	Martina Podeprel	Helioz R&D
32	Matt Evans	Impact Carbon
33	Matteo Triacce	Vestergaard-Frandsen
34	Merri Weinger	USAID
35	Michael Robeson	Pro Cleanse
36	Naomi Bohn	Vestergaard-Frandsen
37	Othniel Habila	UNICEF Ghana
38	Paul Osborn	300in6
39	Victor Pouliquen	Abdul Latif Jameel Poverty Action Lab
40	Gilles Pronost	Nicoll de Nantes
41	Rebecca Peters	University of California, Berkeley

42	Ridu Jeon	Association Partagee
43	Robert Bos	World Health Organization
44	Robert Fraser	International Federation of Red Cross/Red Crescent
45	Roman Schibli	South Pole Carbon
46	Ryan Rowe	Water Institute at University of North Carolina at Chapel Hill
47	S. Gawad	Cairo University
48	Satoshi Takizawa	University of Tokyo
49	Scotto Anne-Marie	Ville d'Eybens - France
50	Sean Furey	SKAT
51	Sjef Ernes	Aqua for All
52	Steve Ade	Pro Cleanse
53	Suree Wongpiyachon	Government of Thailand - Ministry of Health
54	Thor Axel Stenstrom	Stockholm Environment Institute
55	Tim Neville	Vestergaard-Frandsen
56	Modibo D Traore	Societe Malienne de Patrimoine de l'Eau Potable
57	Urs Heierli	IDE, Antenna Technologies
58	Wertz Froncione	Exelio SA
59	William Carter	International Federation of Red Cross/Red Crescent
60	William Geython	Government of Thailand - Ministry of Health

Participant email addresses are available upon request to hwtsnetwork@unc.edu.

Annex 5a: Platform of solutions for Target 1.3.6

HOUSEHOLD WATER TREATMENT SOLUTIONS

Proposed solution	Lifestraw Family Filter
Implementer / Key actor	Vestergaard-Frandsen, tim.neville@lifestraw.com; www.lifestraw.com
Where implemented	Kenya, DRC, Ethiopia, Angola, Cote d'Ivoire, Ghana, Tanzania, Uganda, Zambia, Pakistan, Haiti,
Link for more info	http://www.solutionsforwater.org/solutions/marketing-of-ceramik-household-purification-tools-to-the-bottom-of-the-pyramid-in-indonesia

Proposed solution	Tulip filter (ceramic / diatomaceous earth)
Implementer / Key actor	Nazava, lieselotte.heederik@gmail.com; www.nazava.com
Where implemented	Indonesia
Link for more info	http://www.solutionsforwater.org/solutions/marketing-of-ceramik-household-purification-tools-to-the-bottom-of-the-pyramid-in-indonesia

Proposed solution	Chlorine production
Implementer / Key actor	Cascade Designs, matt.stevenson@cascadedesigns.com; www.cascadedesigns.com
Where implemented	Field tested in Thailand, Kenya, Ghana, and Haiti
Link for more info	http://www.solutionsforwater.org/solutions/a-two-chamber-point-of-use-pou-water-filtration-device-the-uses-a-proprietary-blend-of-porous-ceramic-particles-and-a-mixture-of-biocide-materials-to-filter-and-deactivate-microogranisms-that-cause

Proposed solution	Filtration plus disinfection
Implementer / Key actor	ProCleanse, info@procleansefilters.com; www.procleansefilters.com
Where implemented	19 countries in both rural and urban settings
Link for more info	http://www.solutionsforwater.org/solutions/a-two-chamber-point-of-use-pou-water-filtration-device-the-uses-a-proprietary-blend-of-porous-ceramic-particles-and-a-mixture-of-biocide-materials-to-filter-and-deactivate-microogranisms-that-cause

Proposed solution	Community-based chlorination
Implementer / Key actor	Innovations for Poverty Action, safewater@poverty-action.org; http://www.poverty-action.org/safewater
Where implemented	Rural Kenya, Bangladesh, India, Uganda, Haiti, Swaziland and Somalia.
Link for more info	http://www.solutionsforwater.org/solutions/dispensers-for-safe-water

HOUSEHOLD WATER TREATMENT SOLUTIONS

Proposed solution	Microfiltration and UV disinfection
Implementer / Key actor	Francois Jaquenoud, Executive Director, 1001 fontaines, fr.jaquenoud@free.fr; www.1001fontaines.com
Where implemented	Rural areas of Cambodia, Madagascar
Link for more info	http://www.solutionsforwater.org/solutions/social-entrepreneurs-for-sustainable-access-to-safe-drinking-water-in-rural-areas

Proposed solution	Solar disinfection
Implementer / Key actor	Engineers Without Borders, Germany – Regional Group Hamburg http://www.tu-harburg.de/ingog/ ; Alexander Otto, reffry@gmx.de; Sabine Görg, goerg@idv-goerg.de
Where implemented	Pilot tests in Germany, they are looking for partners to conduct field tests
Link for more info	http://www.solutionsforwater.org/solutions/condensation-tent-for-cleaning-water-with-solar-distillation

Proposed solution	School-based WASH promotion technique
Implementer / Key actor	Grupo de Estudios Ambientales, AC, gea@laneta.apc.org Nelly Libeyre, Chef de projet, nellylibeyre@yahoo.fr
Where implemented	Guerrero, Mexico
Link for more info	http://www.solutionsforwater.org/solutions/eau-assainissement-et-sante-dans-les-ecoles-de-communautes-indigenes-de-guerrero-mexico

Proposed solution	Grey wastewater treatment for other household uses aside from drinking
Implementer / Key actor	Monther Hind – Palestinian Wastewater Engineers Group (PWEG) monther@palweg.org; www.palweg.org
Where implemented	West Bank, Palestine
Link for more info	http://www.solutionsforwater.org/solutions/wastewater-treatment-and-reuse-in-arid-areas

Proposed solution	Chlorination production
Implementer / Key actor	Antenna Technologies, Carole de Bazignan, www.antenna.ch
Where implemented	Bangladesh, Burkina Faso, Cambodia, Cameroon, DRC, Guinea, Haiti, India, Mali, Mozambique, Nepal and Pakistan
Link for more info	http://www.solutionsforwater.org/solutions/watasol-as-a-technology-and-a-methodology-to-produce-chlorine-locally-so-that-communities-can-have-access-to-safe-water

HOUSEHOLD WATER TREATMENT SOLUTIONS

Proposed solution	Bio-sand filter
Implementer / Key actor	Triple Quest / Cascade Engineering, http://www.hydraid.org, Deb Walsh
Where implemented	50,000 units distributed in over 35 developing countries worldwide.
Link for more info	http://www.solutionsforwater.org/solutions/the-hydraid-biosand-water-filter

Proposed solution	Bio-sand filter
Implementer / Key actor	Association for Humanitarian Development (AHD); www.ahdpak.org
Where implemented	Coastal districts (Badin and Thatta) of Sindh Province fo Pakistan
Link for more info	http://www.solutionsforwater.org/solutions/rewarding-innovation-at-local-level-in-sindh-pakistan

Proposed solution	Bio-sand filter and Solar Disinfection
Implementer / Key actor	Óscar Manuel Romero Oropeza Fundación Amor Venezuela fundamorvenezuela@gmail.com / oscarmanuelromero@yahoo.es
Where implemented	Rural communities in Trujillo state, Venezuela
Link for more info	http://www.solutionsforwater.org/solutions/evaluar-potabilizacion-de-agua-en-comunidades-rurales-del-estado-trujillo-venezuela

Proposed solution	Rainwater harvesting and storage
Implementer / Key actor	Mr. G.L Gujar, Water and Sanitation Coordinator, Save the Children, Jaipur,Rajasthan g.gujar@savethechildren.in
Where implemented	50 villages covering 6130 households having 34618 population, which includes 6487 children under five years in Rajgarh Block of Churu district in Rajasthan state of India.
Link for more info	http://www.solutionsforwater.org/solutions/rain-water-harvesting-for-water-and-food-security

Proposed solution	Behavior change communications campaign focus on SODIS, BSF, Piyush (chlorine solution), Colloidal silver filter
Implementer / Key actor	Mr. Anil Sthapit, Director, Guthi, mail@guthi.net , guthi.net@gmail.com www.guthi.net
Where implemented	Nepal
Link for more info	http://www.solutionsforwater.org/solutions/water-caravan-safe-water-campaign

HOUSEHOLD WATER TREATMENT SOLUTIONS

Proposed solution	Ceramic filtration
Implementer / Key actor	Potters for Peace; Potters for Peace website: www.pottersforpeace.org Beverly Pillers (Nicaragua) bevpillers10@gmail.com Kaira Wagoner (US) pottersforpeace@gmail.com
Where implemented	Currently Potters for Peace has helped build factories through alliances with partners in country, for the following factories; Tanzania (3), Nigeria, Kenya (2), Ghana (2), Rwanda, Ethiopia, Yemen, Benin, Indonesia, Sri Lanka, Myanmar (8), Philippines, Pakistan, Cambodia (3), Laos, China, Ecuador, Peru (2), Colombia (2), Nicaragua (3), Guatemala (2), El Salvador, Honduras, Cuba, Dominican Republic (2), Mexico, Senegal, Somaliland.
Link for more info	http://www.solutionsforwater.org/solutions/potters-for-peace-point-of-use-pou-ceramic-water-filter

Proposed solution	Community mobilization and behaviour change
Implementer / Key actor	Department of Medical Research (Lower Myanmar) Dr. Khin Thet Wai, Deputy Director (Research), Dept. of Medical Research (Lower Myanmar) khinthetwaidmr@gmail.com Dr. Pe Thet Zaw, Research Officer, Dept. of Medical Research (Lower Myanmar) pethetzaw@gmail.com
Where implemented	Myanmar
Link for more info	http://www.solutionsforwater.org/solutions/health-and-health-related-community-networks-as-change-agents-for-household-water-treatment-and-storage-in-peri-urban-eco-setting

Proposed solution	Metals/Salts-based
Implementer / Key actor	Aquasalveo Gordon P. Allen gordona@mweb.co.za ; www.aquasalveo.com
Where implemented	South Africa
Link for more info	http://www.solutionsforwater.org/solutions/aqua-salveo-water-disinfectant

Proposed solution	Water storage
Implementer / Key actor	Jon Naugle, Technical Director, EnterpriseWorks/VITA a Division Relief International jon.naugle@ri.org www.ri.org
Where implemented	Commercial pilot in Uganda
Link for more info	http://www.solutionsforwater.org/solutions/private-sector-delivery-of-a-low-cost-flexible-water-storage-container-for-rainwater-harvesting

HOUSEHOLD WATER TREATMENT SOLUTIONS

Proposed solution	Solar disinfection
Implementer / Key actor	Martin Wesian CEO and founder Helioz R&D office@helioz.org
Where implemented	Odisha, India
Link for more info	http://www.solutionsforwater.org/solutions/wadi-inexpensive-and-easy-to-use-water-disinfection

Proposed solution	Community mobilization technique
Implementer / Key actor	Integrated Regional Support Program (Pakistan), Altaf Ur Rahman , http://irsp.org.pk/
Where implemented	Flood-affected areas of Pakistan
Link for more info	http://www.solutionsforwater.org/solutions/water-sources-cleaning-and-disinfection-in-the-flood-affected-areas-of-pakistan

Proposed solution	Solar disinfection
Implementer / Key actor	SODIS/Eawag, Regula Meierhofer, Director, regula.meierhofer@eawag.ch www.sodis.ch
Where implemented	Presently SODIS projects are conducted in 19 countries in Africa (Kenya, Cameroon, Congo DRC, Senegal, Zambia, Togo, Tanzania, Uganda), Asia (India, Nepal, Pakistan, Laos, Papua New Guinea) and Latin America (Bolivia, Ecuador, Guatemala, Honduras, Nicaragua, Peru) in collaboration with local partners.
Link for more info	http://www.solutionsforwater.org/solutions/sodis-solar-water-desinfection-method

Proposed solution	Rainwater storage
Implementer / Key actor	Maria Eugenia Rinaudo, rinaudomannucci@hotmail.com cambioclimaticoytu@hotmail.com , FUDECO http://www.fudeco.gob.ve/
Where implemented	Urdaneta, Venezuela
Link for more info	http://www.solutionsforwater.org/solutions/rainwater-collection-in-rural-areas-case-study-venezuela

Annex 5b: Platform of solutions for Target 1.3.7

CHOLERA SOLUTIONS

Proposed solution	Emergency sanitation – portaloos, kk nag magic plates, and peepoo bags
Implementer / Key actor	Julien Eyrard, jeyrard@actioncontrelafaim.org, Action Contre La Faim and other NGOs involved in WASH cluster
Where implemented	Emergency settings
Link for more info	http://www.solutionsforwater.org/solutions/emergency-sanitation

Proposed solution	Integrated predictive surveillance approach
Implementer / Key actor	Ali Shafqat Akanda, ali.akanda@tufts.edu, Tufts University
Where implemented	Pilot test in Bangladesh
Link for more info	http://www.solutionsforwater.org/solutions/an-integrated-predictive-surveillance-approach-for-reinforcing-cholera-prevention

Proposed solution	Multi-disciplinary operational research into cholera prevention
Implementer / Key actor	Joachim Peeters, jpeeters@actioncontrelafaim.org, Action Contre La Faim
Where implemented	Chad
Link for more info	http://www.solutionsforwater.org/solutions/reduction-de-loccurrence-et-de-lincidence-des-epidemies-de-cholera-au-tchad

Proposed solution	Water treatment unit
Implementer / Key actor	Raoul Antoine, ra@sotrad.be, Sotrad
Where implemented	Numerous African countries and Haiti
Link for more info	http://www.solutionsforwater.org/solutions/preventing-cholera-through-sustainable-cost-effective-water-treatment

Proposed solution	Cholera treatment centres
Implementer / Key actor	Professor Huw Taylor, University of Brighton, h.d.taylor@brighton.ac.uk, http://www.brighton.ac.uk/set/contact/details.php?uid=hdt
Where implemented	Haiti
Link for more info	http://www.solutionsforwater.org/solutions/novel-approaches-to-the-treatment-and-disinfection-of-cholera-treatment-centre-wastewaters-2

Proposed solution	Mobile drinking water units
Implementer / Key actor	Ahsan ul Haq, Loralai Area Water Partnership Pakistan, ahsan_sano89@yahoo.com / lawplri@yahoo.com
Where implemented	Pakistan
Link for more info	http://www.solutionsforwater.org/solutions/mobile-drinking-water-provision-to-drought-affected-people

CHOLERA SOLUTIONS

Proposed solution	Cholera competence – a social vaccine
Implementer	Marlou de Rouw, marlou@communitylifecompetence.org, The Constellation, www.communitylifecompetence.org
Where implemented	Democratic Republic of Congo
Link for more info	http://www.solutionsforwater.org/solutions/cholera-competent-communities-towards-a-social-vaccine

Proposed solution	Community-based chlorination
Implementer / Key actor	Innovations for Poverty Action, safewater@poverty-action.org; http://www.poverty-action.org/safewater
Where implemented	Rural Kenya, Bangladesh, India, Uganda, Haiti, Swaziland and Somalia.
Link for more info	http://www.solutionsforwater.org/solutions/dispensers-for-safe-water

Proposed solution	Lifestraw Family Filter
Implementer	Vestergaard-Frandsen, tim.neville@lifestraw.com; www.lifestraw.com
Implementer / Key actor	Kenya, DRC, Ethiopia, Angola, Cote d'Ivoire, Ghana, Tanzania, Uganda, Zambia, Pakistan, Haiti,
Link for more info	http://www.solutionsforwater.org/solutions/marketing-of-ceramik-household-purification-tools-to-the-bottom-of-the-pyramid-in-indonesia