World Health Organization

WHO/HSE/WSH/12.07

Status of National Household Water Treatment and Safe Storage Policies in Selected Countries

Results of global survey and policy readiness for scaling up

Acknowledgements

The authors would first like to thank the 70 individuals from 46 countries that completed the survey. In addition, the administrative support provided by Lesley Robinson in distributing and following-up on survey responses is gratefully acknowledged. Several WHO staff offered important contributions to the survey content, translation and the material in this report. These include: Didier Allély-Fermé, Robert Bos, Claire-Lise Chaignat, Bruce Gordon, Alexandria Hill, Dominique Maison, Mariam Otmani Del Barrio, and Judy Sanchez Santana. Finally, the survey questions benefited from input received from Michael Forson, UNICEF and the Policy/Advocacy Working Group of the International Network on Household Water Treatment and Safe Storage.

Contents

Summary

Household water treatment and safe storage (HWTS) is a proven intervention to improve drinking-water quality and reduce diarrhoeal disease. Achieving meaningful health gains from HWTS requires scaling-up of the intervention to those populations most at risk. Such scaling-up depends, in large part, on national enabling environments and policies. To assess the status of national HWTS policies and regulations and progress towards the global policy targets, WHO conducted a brief survey. This report details the responses from this survey and categorizes countries into three tiers of readiness to scale-up HWTS. Based on identified challenges, greater support is needed to develop and implement national HWTS policies, encourage integration with other health interventions and diarrhoeal disease prevention efforts, and strengthen monitoring, evaluation and regulation.

1. Introduction

An estimated 780 million people drink water from unimproved sources, and millions more drink contaminated water from improved sources (UNICEF/WHO, 2012). Unsafe drinking-water, along with inadequate hygiene and sanitation contributes to an estimated 1.9 million annual deaths, primarily in children under five (WHO, 2012). While countries work to provide universal access to safe, reliable, piped-in water, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have called for targeted, interim approaches that will accelerate the health gains associated with safe drinking-water. One such approach is household water treatment and safe storage (HWTS), to both treat contaminated drinking-water and prevent contamination during collection, transport, and use in the home. A growing body of evidence demonstrates that the use of HWTS methods improves the microbiological quality of household water and reduces the burden of diarrhoeal disease in users (Clasen *et al.*, 2007; Fewtrell *et al.*, 2005; Waddington *et al.*, 2009). Furthermore, the 7-point strategy for comprehensive diarrhoea control, adopted by UNICEF and WHO in 2009, includes household water treatment and safe storage as a proven intervention to reduce child mortality (UNICEF & WHO, 2009).

Globally, HWTS efforts are promoted through the International Network on Household Water Treatment and Safe Storage (the "Network"). 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 Network mission. Specifically, this 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*" (WHO/UNICEF, 2011). The main areas of Network activity are reflected in four working groups: policy/advocacy, research/knowledge management, implementation/scale-up and monitoring and evaluation.

One key challenge in realizing benefits from HWTS is limited coverage in areas and among populations where water quality improvements would have an important impact on health. Except for boiling in parts of Asia, no proven HWTS technology has been scaled-up (Rosa and Clasen, 2010). Achieving tangible results in the scaling-up of household water treatment and safe storage depends, in large part, on national enabling environments and policies. To accelerate efforts on establishing national HWTS policies, an international target was set in 2011 by the Network and subsequently adopted by the 2012 World Water Forum (WHO, 2012). This target

states: “by 2015, 30 countries have established policies on household water treatment and safe storage.” (WHO/UNICEF, 2011)

In order to assess the status of national HWTS policies and regulations and progress towards the global target, WHO conducted a short survey. This report details the responses from this survey and provides a brief discussion regarding readiness of countries to scale-up HWTS based on current policies and government support for HWTS.

2. Survey and methods

In early 2012, WHO developed a survey of 15 questions concerning institutions, policies, implementation and regulation (see Appendix 1). The survey incorporated inputs from the Network Policy/Advocacy Working Group. In addition to assessing national HWTS policies, the survey sought to better understand national evaluation and regulation of HWTS. This is especially important in light of the new WHO health-based criteria that enable governments to evaluate whether a household water treatment technology reduces waterborne pathogens sufficiently to protect health (WHO, 2011). The final objective was to make general inferences regarding the political readiness of individual countries to scale-up and integrate HWTS into key health initiatives.

A formal memo and electronic link to the online survey was sent to all Regional WHO offices, individually to the 46 WHO country offices in the African Region, and to over 1,000 Network listserve subscribers. As of May 2012, there were 70 responses to the survey of which 46 were unique. The largest proportion of responses, 46%, was from the African region followed by the Eastern Mediterranean region with 20% (**Table 1**).

Table 1. Responding Countries by WHO Region

African			**Americas**	**Eastern Mediterranean**
Burkina Faso	Gambia (the)	South Africa	Haiti	Iran (Islamic Republic of)
Burundi	Ghana	Swaziland	Honduras	Jordan
Congo (the)	Kenya	Togo	Uruguay	Oman
Côte d’Ivoire	Madagascar	Uganda		Pakistan
Democratic	Malawi	United Republic		Saudi Arabia
Republic of	Mali	of Tanzania (the)		Somalia
the Congo	Mozambique	Zimbabwe		Sudan (the)
(the)	Nigeria			Syrian Arab Republic (the)
Ethiopia	Rwanda			Tunisia

European	**South-East Asia**	**Western Pacific**
Andorra	Bangladesh	Cambodia
Estonia	Indonesia	Lao People’s Democratic
France	Nepal	Republic
Hungary		Philippines (the)
Netherlands (the)		
Norway		

Applying UN socio-economic classifications, 43% of responses are from the “least developed” countries and 15% are “developed” countries (United Nations, 2003). Ministries of health or

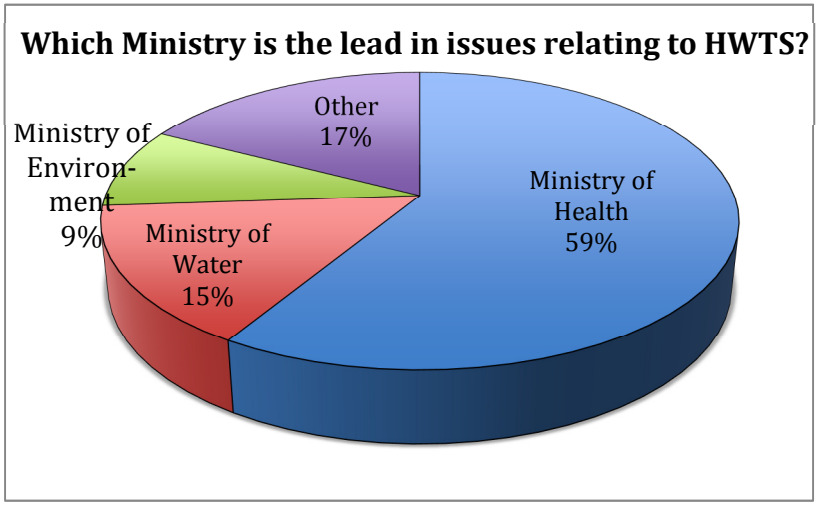
water from the countries' governments completed 43% of responses, with the remaining responses coming from the WHO, UNICEF and other international/national organizations.

3. Results

The results are summarized according to the four main sections of the survey: institutions, policies and targets, policy implementation, and regulation and evaluation. The final section of the results presents an overview of readiness to scale-up HWTS based on planned or in-place policy structures.

3.1 Institutions

Ministerial leadership on HWTS is one key component of developing and implementing national policies relevant to HWTS. Over half or 59% of the 46 responding countries, indicated that the Ministry of Health is the lead in issues relating to HWTS. In other countries, the Ministry of Water and the Ministry of Environment were lead ministries, accounting for 15% and 9%, respectively of responses (**Figure 1**). Those ministries in the "other" category include the Ministry of Housing and Construction (Syria), the Ministry of Social Affairs (Estonia) and the Ministry of Rural Development (Cambodia).



While HWTS is primarily a preventative health intervention, effective implementation requires inter-ministerial collaboration. For example, targeting areas without safe drinking-water supplies requires working with the Ministry of Water while integrating curriculum on the importance of safe drinking-water and treatment options necessitates involvement of the Ministry of Education.

Figure 1. Lead ministries for HWTS Policies

Collaboration on HWTS issues is nearly universal among responding countries. Nearly all, 91%, indicated that two institutions collaborate on HWTS issues and 54% have three or more institutions working together. In a great majority of instances this involves the Ministry of Health and the Ministry of Water. To coordinate HWTS collaboration, nearly two-thirds of responding countries (63%) have established an inter-ministerial committee. Examples of these are the National Water Forum in Bangladesh, the National Water and Sanitation Committee in the Democratic Republic of the Congo, and the National Household Water Treatment Technical Working Group in Kenya.

3.2 Policies and Targets

Policies and targets on HWTS are important for allocating resources and justifying further investments and the majority of responding countries (72%) have national policies in place that address HWTS. While stand-alone HWTS policies are not essential and may be

counterproductive towards integration of HWTS with disease prevention efforts, inclusion of HWTS in health, sanitation, emergency and water quality policies is common among responding countries (**Figure 2**).

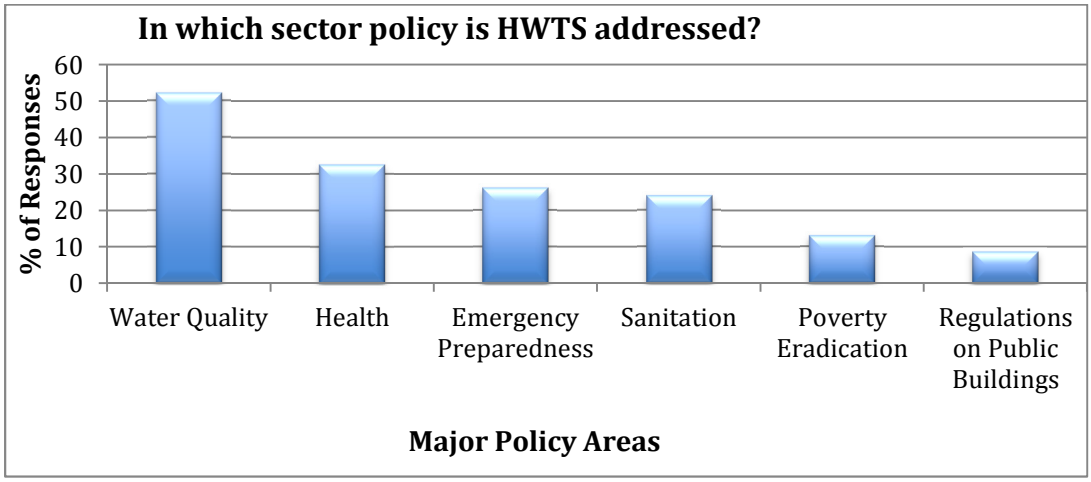


Figure 2. Inclusion of Household Water Treatment and Safe Storage in National Policies

In addition, countries were asked to provide details on policies related to HWTS. Most of the policies focused on water quality and supply or disease prevention and control. Within these policies, HWTS is not necessarily mentioned, but rather the importance of safe drinking-water is highlighted[1]. Only two of the responding countries (Ghana and Tanzania) indicated that they have a national strategy for HWTS that bridges the many national water and health efforts where HWTS is included. Therefore, although 72% of responding countries indicated they consider HWTS within national policy structures, HWTS may only figure as a minor issue, without formalized linkages among the different policies and ministries.

Less than half, 43% (20 countries), of responding countries reported having targets relevant to HWTS. Out of the 20 targets, 15 focus on water quality or general health aspects and only five (Ethiopia, Ghana, Haiti, Rwanda and Tanzania) countries have specific HWTS targets (**Table 2**).

Table 2. National Household Water Treatment and Safe Storage Targets

Health	Sudan	Reduce water-related diseases
	Togo	Reduce waterborne diarrhoeal deaths by half
Safe Drinking-Water	Bangladesh	Provide access to safe water for all by 2015
	Nepal	By 2017, 27% of vulnerable population will have safe drinking-water; By 2027, 50% of this population will have access
	Oman	By 2020, every household should have efficiently treated water supplied by either the government or individual and safe storage
	Uruguay	Provide safe drinking-water to rural populations of 100 inhabitants or less

[1] A selection of these policies are provided in Appendix A2.

HWTS	Ethiopia	By 2015, 77% of households will safely treat and store drinking water
	Ghana	By 2015, 90% of population who do not yet have access to potable water will consistently practice an effective HWTS method
	Haiti	Develop an effective regulation system for HWTS products and techniques
	Rwanda	By 2018, 65% of households will drink water that has been treated in the home
	United Republic of Tanzania	By 2017, increase effective water treatment and safe storage use in households by 20%

3.3 Implementation Support and Challenges

While policy development is important, implementation of such policies is equally critical and often challenging. Of the 42 (91%) responding countries that indicated government support for HWTS, the most common measure listed was advocating for integration of HWTS into health programmes (**Figure 3**). For example, HWTS is increasingly being included in maternal and child health programmes in order to reduce childhood diarrhoeal morbidity and mortality.

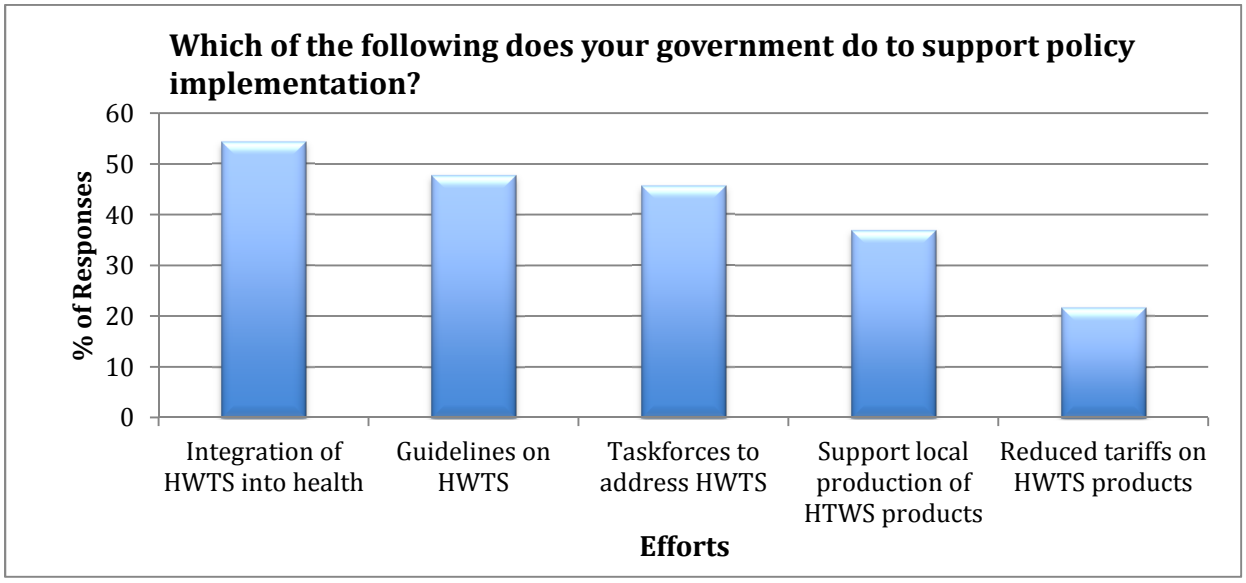


Figure 3. Government Efforts for Household Water Treatment and Safe Storage

Other supportive government actions listed include development of guidelines on HWTS (48%) and the creation of taskforces to address HWTS (46%). A sizable proportion of countries have also reduced and/or eliminated tariffs on imported HWTS products (22%), often categorizing HWTS as "essential medicines" in order to reduce the cost barrier of such products.

While there is indication of government support for HWTS, implementation challenges are great. A large majority, 76%, of countries identified limited monitoring of HWTS use and impact as one of the key challenges. Other stated challenges include limited coordination among ministries, lack of regulation/evaluation and limited awareness of role of HWTS in health (**Figure 4**).

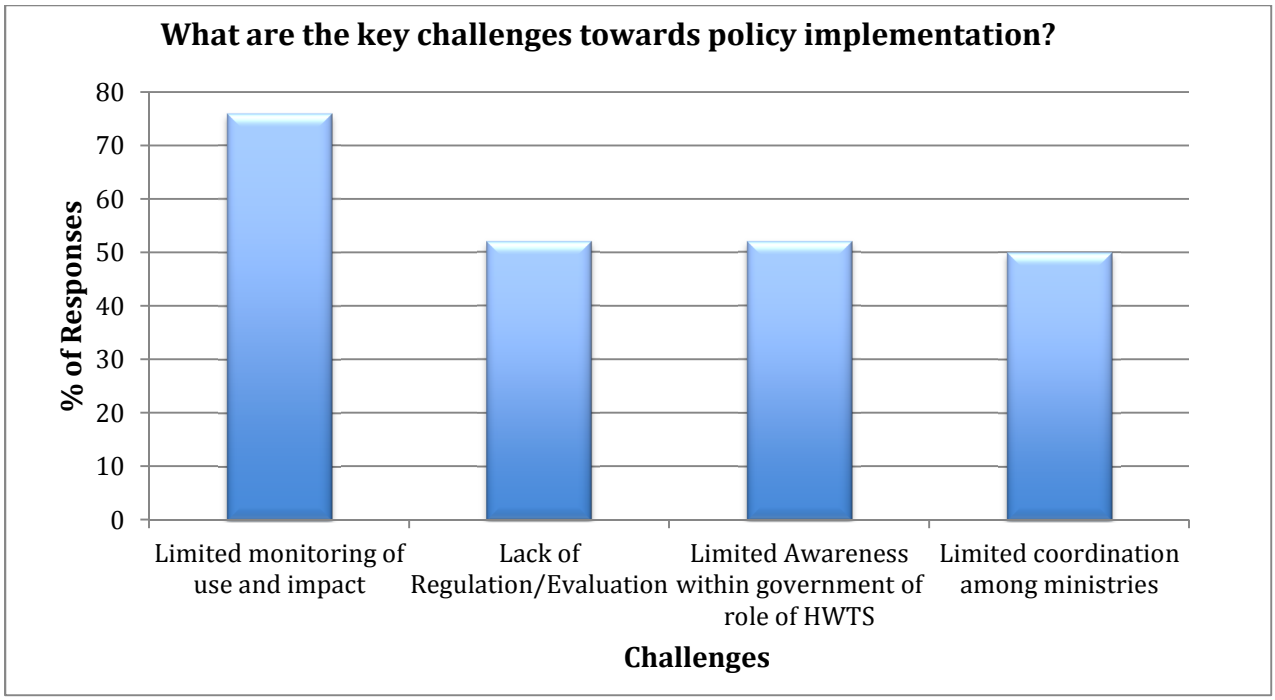


Figure 4. Key Challenges of Policy Implementation

In addition, lack of funding, although not one of the given answer choices, was listed by several countries. Eleven countries (Bangladesh, Burundi, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Ghana, Hungary, the Islamic Republic of Iran, Jordan, Nepal and Rwanda) identified all four choices as key challenges for their countries.

3.4 Regulation and Evaluation

While most countries consider HWTS within policy structures, less than half evaluate or regulate HWTS. Only 41%, the smallest proportion for all questions, of responding countries regulate products according to their performance, or ability to remove chemical and microbial contaminants. A much larger proportion, 65%, of countries certify or recognize internationally certified household water treatment technologies. While it is not clear why there is such a large discrepancy between those that regulate HWTS and those that certify HWT, it may indicate a lack of clarity on these issues and/or misunderstanding of the survey question. This is discussed further in the next section. Out of those countries that do certify HWTS technologies, 73% test the technology in a laboratory setting (**Figure 5**).

In those countries that do have a formal regulation system, the lead ministry is the ministry of health followed by the bureau of standards and the ministry of water (48%, 13% and 13%, respectively). Other lead regulation ministries included the Ministry of Industry and Trade (Lao People's Democratic Republic), the Administration of State Sanitary Work (Uruguay), and the National Action Committee on Water, Sanitation and Hygiene (Zimbabwe).

Of those countries that indicated laboratory testing as a requirement for national certification, indicator bacteria[2] are the most commonly tested parameter at 59% followed by physico-chemical contaminants at 37%. Some countries (39%) also reported testing for pathogens such as bacteria, viruses or protozoa; however, this information has not been confirmed.

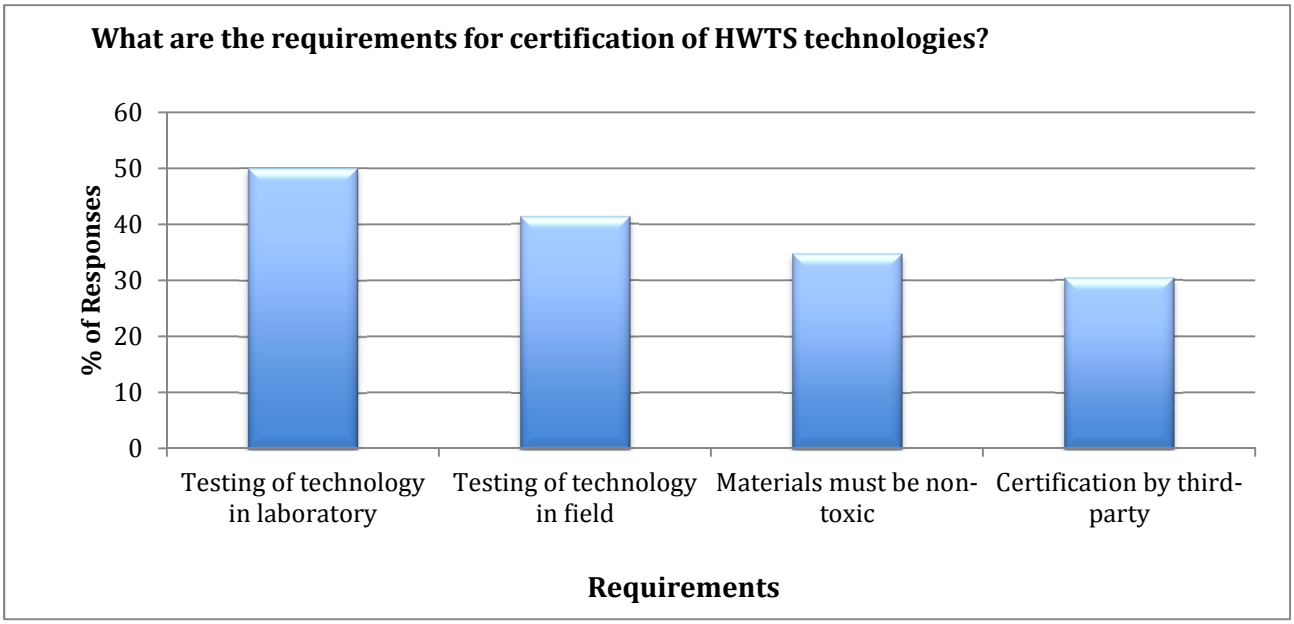


Figure 5. Requirements for Certification of HWTS

3.5 Readiness to Scale-Up based on Policy Structures

Using a simple matrix of the presence of five key policy and regulation elements, an assessment of readiness to scale-up HWTS was conducted. Specifically countries were assessed on the existence of national policies, national HWTS targets[3], a committee and/or structure for HWTS coordination, regulations on HWTS products and certification of HWTS technologies. Countries were divided into three tiers. Those that had four to five elements were in the first tier, those with three in the second tier and those with two or less is the bottom tier (**Table 3**). While it is important to note that this is a limited assessment of HWTS policies and does not consider the extent of policy implementation or other important socio-cultural aspects of sustaining HWTS, it does provide an important snapshot of political readiness to scale-up HWTS.

Table 3. Country Readiness to Scale-Up HWTS

Total	**Countries**	**Elements**				
		Policies	*Targets*	*Committee*	*Regulation*	*Certification*
Tier 1						
5	Ethiopia	x	x	x	x	x
5	Ghana	x	x	x	x	x
5	Uruguay	x	x	x	x	x

[2] Responding countries indicated that national laboratories most often test for the following indicator bacteria: total coliform, fecal coliform and *E. Coli*.

[3] Includes targets specific to HWTS and those specific to safe drinking-water where HWTS is recognized as an important intervention. In total eight countries have targets (see Table 2).

Total	Countries	Elements				
		Policies	*Targets*	*Committee*	*Regulation*	*Certification*
4	Bangladesh	x	x	x		x
4	Democratic Republic of the Congo (the)	x		x	x	x
4	France	x		x	x	x
4	Haiti	x	x	x		x
4	Kenya	x		x	x	x
4	Rwanda	x	x	x		x
4	Sudan (the)	x		x	x	x
4	Syrian Arab Republic (the)	x		x	x	x
4	Togo	x		x	x	x
4	Tunisia	x		x	x	x
4	Uganda	x		x	x	x
4	Zimbabwe	x		x	x	x
Tier 2						
3	Estonia	x		x	x	
3	Lao People's Democratic Republic	x		x		x
3	Hungary			x	x	x
3	Malawi	x		x		x
3	Mozambique	x			x	x
3	Nepal	x	x	x		
3	Nigeria			x	x	x
3	Oman	x			x	x
3	Swaziland	x		x		x
3	United Republic of Tanzania (the)	x	x	x		
Tier 3						
2	Austria	x				x
2	Cambodia	x		x		
2	Côte d'Ivoire	x				x
2	Gambia (the)	x				x
2	Honduras			x		x
2	Indonesia	x		x		
2	Mali			x		x
2	Pakistan	x		x		
2	Saudi Arabia	x				x
1	Andorra	x				
1	Burkina Faso					x
1	Iran (Islamic Republic of)	x				
1	Madagascar				x	
1	Netherlands (the)				x	
1	Norway	x				
1	Philippines (the)			x		
1	Somalia					x
0	Jordan					
0	Burundi					
0	South Africa					

Fifteen of the 46 responding countries (33%) are in top tier and three of these (6%); Ethiopia, Ghana and Uruguay had all five elements. It is important to note that four of the countries in Tier 1, France, Syria, Tunisia and Uruguay, have high levels of improved drinking-water and sanitation and relatively lower diarrhoeal disease burdens. While there still may be a need for HWTS in these countries in special situations, the scaling-up strategies may be different than that of other countries where there is considerably less access to safe drinking-water supplies. Tier 2 has 11 (24%) countries while Tier 3 is comprised of 20 (43%) countries. Inclusion in the second and third tier does not necessarily indicate that a country is failing to address HWTS and as discussed in the next section, certain countries in these tiers are making important progress in establishing national HWTS policies and scaling-up the intervention.

4. Discussion

The discussion focuses on three main issues that emerged from the survey. These include: country readiness to scale-up HWTS, government support of HWTS and challenges to policy implementation. In reflecting on the results it is important to recognize that limited resources to conduct this survey did not allow for rigorous follow-up on responses, none of which have been officially endorsed by national governments. In several instances there were conflicting responses from multiple individuals within one country and while attempts were made to clarify these, it was not possible in all instances. Therefore, this survey and the results are meant to serve as a platform for discussion and identify countries and areas where further policy strengthening would serve to facilitate scaling up of HWTS.

4.1 Country readiness to scale-up HWTS: a snapshot

As highlighted in Table 3, nearly all responding countries have at least one element in place regarding HWTS national policies. Countries in Tier 1 and to a lesser extent Tier 2 offer interesting case studies from which more in-depth analyses and reviews could provide specific information on how to strengthen policy frameworks and existing efforts to translate policy into action. Conversely, for those countries in Tier 3, especially those with a high burden of diarrhoeal disease, including cholera outbreaks, there is an opportunity to encourage inclusion of HWTS into key health and water quality policies as well as support policy implementation in order to reduce the diarrhoeal disease burden.

Ghana is an example of a country in Tier 1 that is actively working at the national level to scale-up HWTS. In February of 2011, Ghana enacted the National Strategy for Household Water Treatment and Safe Storage, which seeks to scale up HWTS as a temporary solution for populations without access to safe drinking-water or sanitation. By 2015, Ghana aims to have 90% of the population aware of HWTS and 15% effectively using HWTS methods (Kyomuhendo, 2011). To achieve this, the country plans to create a certification and product labeling system for HWTS products, evaluate alternative HWTS products for floods, disease outbreaks or other emergency situations and to collaborate with NGOs or the private sector to pilot new HWTS technologies, among other efforts.

Another country from Tier 1 that provides an interesting case study is the Democratic Republic of Congo (DRC). While ongoing instability in the East of the country presents a major challenge to provision of health and water service, it also indicates a need for interventions that can be rapidly deployed. This is especially true in regards to cholera, which is endemic in five Eastern provinces with the number of new cases increasing as of July 2012. Epidemiological

investigations indicate that insufficient access to safe drinking-water is the main cause of the epidemic (WHO, 2012). Efforts to support implementation of the policies in place could make an important impact on preventing cholera. Indeed, a WHO workshop on cholera prevention and control held in Lubumbashi in July 2011 outlined specific actions to effectively prevent and control cholera yet resources are needed to assist in implementation.

An example of a country in Tier 2 that has taken concrete action on HWTS policies and implementation is Tanzania. The Government has developed a clear strategy on HWTS entitled "Comprehensive Country Plan for Scaling Up Household Water Treatment and Safe Storage 2011-2016". Similar to the Ghanaian Strategy, this document recognizes the need for HWTS in Tanzania and sets clear, attainable goals to achieve. Specifically, Tanzania aims "to increase by 20% the usage of acceptable [HWTS] methods…by 2016" and in doing so hopes "to empower people to manage their drinking water in households to prevent and control diarrhoea and other waterborne diseases" (MoH, 2012). Tanzania's efforts to achieve this include introducing incentives for HWTS products, integrating HWTS into existing interventions such as HIV/AIDS home care and school health programs, conducting a national campaign advocating for HWTS and establishing performance evaluations for HWTS products (MoH, 2012).

Conversely, the survey revealed that there are some countries where strengthening HWTS policies could have an important effect on scaling-up HWTS and in-turn improving health. For example, four countries (Burundi, Mali, Rwanda, Somalia), in Tier 3 have a considerable need for HWTS as identified by low access to "improved" sources of drinking-water and likely even less to safe drinking-water and a high water-, sanitation-, and hygiene-attributable diarrhoeal disease burden (WHO, 2012). These countries, especially Somalia and Mali, also have a relatively high number of cholera cases (WHO, 2012). Thus there is an important opportunity in these countries to promote and implement HWTS national policies as part of a larger strategy to prevent cholera and reduce the diarrhoeal disease burden.

4.2 Government action and policy implementation challenges

It is encouraging that most governments provide some support to HWTS. Integration of HWTS into health programs is the most common government action. The extent, however, to which this integration is actually operationalized, is likely less than what is indicated through this survey. Promising results in regards to uptake and sustained practices from efforts to integrate HWTS into HIV/AIDS efforts in Kenya (Luganda et al., 2010) and Uganda (Lule, et al., 2005) and antenatal clinics in Malawi (Sheth, et al, 2010), demonstrate the viability of integration. Thus, with government support and the demonstrated proof of concept, there is a sound basis to support scaling-up of such efforts.

The challenges to HWTS policy implementation are many, and compounded by the fact that the countries where the need for HWTS is greatest are also the most economically impoverished. The most frequently noted challenge to HWTS was limited monitoring of use and impact. The need for more rigorous monitoring and evaluation of public health interventions such as HWTS is part of a growing movement toward greater accountability that includes "results-based financing" or "pay-for-performance" (WBG, 2012). This trend focuses on measuring outputs, such as households relying on unsafe sources whose drinking water has been treated effectively at home, as opposed to inputs, such as the number of filters or chlorine tablets delivered. The information gained through robust and harmonized monitoring will allow for more reliable and comparable

assessments of the value of HWTS; this, in turn, can be used to justify government support of scaling-up.

Regulation and performance evaluation is another important challenge common to many of the responding countries. While most governments already take some action associated on regulating household water treatment, efforts could be strengthened. This is especially true in less developed countries which are less likely compared to developed countries (33 vs. 57%) to have in place national regulations on HWTS products.

Finally, limited coordination among ministries and awareness within the government of the role of HWTS is an important challenge to address. Countries have found various mechanisms to improve coordination such as an inter-ministerial task force (Kenya) and formal signatures of memorandum of understandings among relevant ministries (Tanzania). These efforts along with raising awareness require internal champions who are able to effectively mobilise leadership on HWTS issues.

5. Recommendations

Based on the results, especially regarding national challenges to policy implementation, several recommendations are important to highlight. These include:

- Supporting formation and implementation of national HWTS policies and programmes
  - Regional integration workshops and action plan development
  - Focused country support

- Linking to other national health and water quality strengthening policy efforts
  - WHO Landscape Analysis on Readiness to Accelerate Action on Nutrition
  - Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)

- Disseminating tools on HWTS evaluation and regulation
  - Monitoring and evaluation toolkit on HWTS (WHO/UNICEF, 2012)
  - Evaluating HWT microbial performance (WHO, 2011)

- Facilitating integration of HWTS into disease prevention and control efforts
  - Cholera prevention and control
  - HIV/AIDS prevention and care
  - Nutrition
  - Maternal and Child Health

- Promoting innovative financing
  - Vouchers
  - Microfinance
  - Carbon credits (UNFCC, 2012)

Supporting countries in developing and implementing national HWTS policies and programmes is critical for raising government awareness and providing the impetus to take action. The Network is assisting in such efforts through regional integration and policy strengthening workshops. These workshops bring together nationals from the ministry of health and water as

well as HWTS implementers, manufacturers, and researchers to exchange ideas and solutions for scaling-up and sustaining HWTS. In addition, nationals are tasked with developing and presenting HWTS action plans which are then vetted and further developed upon return to their countries. Workshops were held for East Africa in 2011 (Ethiopia, Kenya, Rwanda, Tanzania, Uganda); WHO/UNICEF, 2012, Southern Africa (Malawi, Mozambique, Zambia) in 2012, with additional workshops proposed for West Africa and Southeast Asia in 2013.

In addition, to these HWTS focused efforts, it is recommended that, where feasible, HWTS policy aspects should be considered in the review and development of other national health, water, sanitation and hygiene policies. One such example is the WHO Landscape Analysis on Countries' Readiness to Accelerate Action in Nutrition (WHO, 2012). The analysis involves in-depth assessments of the 36-high burden countries which are home to 90% of the world's stunted children. These are also many of the same countries with the greatest need for safe drinking-water. Another effort with links to HWTS is GLAAS, which monitors the inputs required to extend and sustain water, sanitation and hygiene systems and services. In the most recent report, the majority of countries had drinking-water policies (77%) but similar to HWTS, struggled with coordination and implementation (WHO, 2012). Thus, in responding to this identified need, there may be an opportunity to address similar challenges in regards to HWTS.

Dissemination of existing tools on regulation and evaluation is one important mechanism for addressing challenges in this area. The WHO document, "Evaluating household water treatment options: microbial performance specifications" provides the technical basis to guide governments in developing schemes for evaluating the microbial performance of household water treatment and its potential impact on health (WHO, 2011). Further efforts are needed to assist governments in applying the recommendations in this document to national settings and contexts. To compliment this document, WHO with UNICEF are developing a toolkit for monitoring and evaluating (M&E) HWTS in the field (WHO/UNICEF, 2012). The toolkit aims to address the challenge of assessing use and impact by providing an overview of M&E components, harmonized indicators, sample surveys and additional resources.

As discussed in the previous section, integration of HWTS into key public health initiatives is increasingly being recognized as an important way to achieve greater health gains. Integration is supported by a variety of mechanisms including recognizing HWTS as an essential medicine which enables HWTS to more easily reach health care centers, including HWTS as a possible intervention in funding grants for disease prevention and control and encouraging partnering of health officials with those in water and community development.

Finally, public health funding is limited and combining more efficient use of public funds, through integration, with other financing may alleviate this challenge. In many situations willingness to pay for HWTS is less than the cost of the technology (Null, et al., 2012) and thus partial subsidies, through the use of vouchers redeemed at local businesses or sales through local health workers may increase affordability while still creating a revenue chain. Other examples of possible funding include microfinance schemes (PATH, 2012) and use of carbon credits, which have been used to off-set environmental impacts associated with boiling (UNFCC, 2012).

6. Conclusion

This survey of national household water treatment and safe storage policies provides a general indication of countries readiness to scale-up HWTS based on their policy frameworks. Undeniably, important questions still remain regarding the extent to which these policies influence investments in HWTS and increased uptake of HWTS, especially among vulnerable populations. Nevertheless this survey has identified countries that are taking important policy initiatives to scale-up HWTS and ensure HWTS is included in key preventative health efforts. It has also highlighted where, with additional support to strengthen key policy elements, greater progress can be achieved.

7. References

Clasen T *et al.* (2007). Interventions to improve water quality for preventing diarrhoea: systematic review and meta-analysis. *BMJ,* 334(7597):782.

Fewtrell L *et al.* (2005). Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis. *Lancet Infect Dis,* 5(1):42-52.

Kyomuhendo M et al. (2011). *National Strategy for Household Water Treatment and Safe Storage in Ghana*. The Republic of Ghana. Accra, Ghana.

Lugada E, Millar D, Haskew J, *et al.* Rapid implementation of an integrated large-scale HIV counseling and testing, malaria and diarrhea prevention campaign in rural Kenya. *PLoS ONE*, 5(8), 2010: e12435.

Lule, et al. Effect of home-based water chlorination and safe storage on diarrhoea among persons with human immunodeficiency virus in Uganda. *American Journal of Tropical Medicine and Hygiene*. 73 (5), 2005: 926-933.

Ministry of Health and Social Welfare (2012). *Comprehensive Country Plan for Scaling Up Household Water Treatment and Safe Storage 2011-2016*. The United Republic of Tanzania, Ministry of Health and Social Welfare, Preventive Department. Dar es Salaam, Tanzania.

Null, et al. (2012). *Willingness to pay for cleaner water in less developed countries: systematic review of experimental evidence*. 3ei. http://www.3ieimpact.org/en/evidence/systematic-reviews/details/213/

PATH (2012). *Microfinancing boosts uptake of water filters*. Seattle, USA. http://www.path.org/publications/detail.php?i=2066

Results based financing for Health. Visited 24 July 2012. http://www.rbfhealth.org/rbfhealth/

Rosa G, Clasen T (2010). Estimating the scope of household water treatment in low- and medium-income countries. *Am J Trop Med Hyg,* 82(2):289-300.

Sheth, et al. Impact of Integration of Water Treatment and Handwashing Incentives with Antenatal Services in Hygiene Practices of Pregnant Women in Malawi. *American Journal of Hygiene and Tropical Medicine*, 83(6), 2010:1315-1321.

UNICEF/WHO (2009). *Diarrrhoea: why children are still dying and what can be done.* Geneva, Switzerland, United Nation's Children's Fund, World Health Organization (http://www.who.int/maternal_child_adolescent/documents/9789241598415/en/index.html).

United Nations (2003). *Millennium Development Indicators: World and Regional Groupings*. Geneva, Switzerland, United Nations (http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Data/RegionalGroupings).

United Nations Framework for Climate Change (2012). *Clean Development Mechanism.* http://cdm.unfccc.int/about/index.html

Waddington H *et al.* (2009). *Water, Sanitation and Hygiene Interventions to Combat Childhood Diarrhea in Developing Countries* London, UK, 3ie Review.

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

WHO/UNICEF (2011). *Report of a workshop for countries in East Africa: National Household Water Treatment and Safe Storage Strategies and Integrated Household Environmental Health Interventions. (*http://www.who.int/household_water/resources/en/)

WHO/UNICEF (2012). *Monitoring and evaluation household water treatment and safe storage toolkit*. Revised Draft. (Final publication expected in Q4 2012).

WHO (2010). Landscape Analysis on Countries' Readiness to Accelerate Action in Nutrition. Geneva, Switzerland. http://apps.who.int/nutrition/landscape_analysis/en/index.html

WHO (2011). *Evaluating household water treatment options: health-based targets and performance specifications.* Geneva, World Health Organization, (http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf)

WHO (2012). Cholera outbreaks in the Democratic Republic of Congo (DRC). Press Release. (http://www.who.int/csr/don/2012_07_23/en/index.html)

WHO (2012). *Global Analysis and Assessment of Sanitation and Drinking-Water*. World Health Organization, Geneva, Switzerland. (http://whqlibdoc.who.int/publications/2012/9789241503365_eng.pdf).

WHO (2012). *Global burden of disease (2004 data).* Geneva, Switzerland, World Health Organization, (http://www.who.int/quantifying_ehimpacts/global/envrf2004/en/index.html)

WHO (2012). *Report from the 2012 World Water Forum: Household water treatment and safe storage and Cholera sessions.* Geneva, Switzerland, World Health Organization. (http://www.who.int/household_water/resources/en/)

WHO (2012). *World Health Statistics*. Geneva, Switzerland, World Health Organization. (http://www.who.int/gho/publications/world_health_statistics/2012/en/)

Appendix 1.Survey of National Household Water Treatment and Safe Storage Policies

1. Existing and/or Policies being Developed
Is HWTS addressed in national policies?
Yes
No

If yes, in which of the following is HWTS addressed?
(can select more than one)
National water quality strategies/policies
National public health strategies/policies
National sanitation strategies/policies
Local government policies
Emergency preparedness plans/strategies
Poverty eradication strategies
Other, please fill in

Please list the names of the policies in which HWTS is addressed below.

Has your country set specific national targets for HWTS?
Yes
No

If, yes what is/are the national target(s)? (please write below)

2. Institutional Structure
Which Ministry is the lead in issues relating to household water treatment and safe storage?
(select ONLY one)
Ministry of Health
Ministry of Water (or equivalent)
Ministry of Environment (or equivalent)
Other, please fill in

Which ministries collaborate, either formally or informally with the lead ministry on HWTS (select all that apply)?
Ministry of Health
Ministry of Water (or equivalent)
Ministry of Environment (or equivalent)
Other, please fill in

3. HWTS Policy Implementation
Which of the following does your Government do to support policy implementation? (select all that apply)
Taskforces/working groups to address specific HWTS themes
Guidelines on HWTS
Advocacy for integration of HWTS into public health programs
Reduced/no tariffs on importation of HWTS
Other, please fill in

Is there a national committee or other national body to coordinate HWTS activities between ministries and authorities/agencies?
Yes
No

If yes, please give a short description of the committee/body's authority and frequency of meetings.
Fill in

What are the key challenges towards policy implementation? (select all that apply)
Limited coordination among ministries
Limited monitoring of HWTS use and impact
Lack of regulation/evaluation of ability of HWTS to make water safer
Limited awareness within government of role of HWTS in health
Other, please fill in

4. Evaluation and Regulation of HWTS
Are there national regulations regarding HWTS products sold and used in the country?
Yes
No

Please briefly describe what is included in these regulations.
Fill in

Which agency has the lead in regulation of HWTS?
Ministry of Health
Ministry of Water
Bureau of Standards
Ministry of Commerce/Industry
Other, please fill in

Does the national government certify or recognize internationally certified household water treatment technologies?
Yes
No

If yes, what are the requirements for certification?
Certification by third-party, international organization (i.e. NSF)
Testing of technology in laboratory
Testing of technology in field
Project materials must be non-toxic
Other (please specify)

If laboratory testing is conducted, which parameters are evaluated to assess performance?
(select all that apply)
-indicator bacteria (i.e. faecal coliforms)
-bacteria
-protozoa
-viruses or bacteriophages
-physio-chemical (i.e. fluoride)
-Other (please specify)

Appendix 2. Selection of National policies addressing HWTS

Country	Policy
Andorra	Regulation on health criteria of water quality for human consumption, 17 October 2007.
Bangladesh	National policies for safe water supply and sanitation 1998; National policies for Arsenic mitigation 2004; Health Population Nutrition Sector Development Plan (2011-2016); National sanitation policies 2005; Sector Development Plan SDP (2011-2025)
Cambodia	National Strategy of Rural Water Supply and Sanitation
Democratic Republic of the Congo (the)	National policy of public service; National strategy of water and rural sanitation; National Strategy to Fight Against Cholera (All under development) (translation from French)
Estonia	Programme of Public Health Development 2009-2020; Environmental Strategy 2030
France	Public health Law - articles L. 1321-7 et R. 1321-43
Gambia (the)	National Health Policy National Water Policy
Ghana	Ghana National Strategy for Household Water Treatment and Safe Storage National Water Policy
Indonesia	Ministerial Decree of National Strategy of Community Based Total Sanitation launched 2008; Ministerial decree of drinking water quality monitoring launched 2012; Ministerial decree of drinking water quality standard launched 2010
Iran (Islamic Republic of)	Education of using 1% stock chlorine or boiling for water disinfection as a strategy in rural areas without access to disinfected water or in emergency situation.
Kenya	In public health act for public buildings, also a section in the PSRP on water quality
Lao People's Democratic Republic	Law on Hygiene, Prevention Diseases and Health Promotion; Ministerial Agreement on the management of the Drinking Water Quality Standard and Domestic Water Use.
Malawi	National water policy; Environmental Health policy
Nepal	Rashtriya Khanepani Gunastar Mapdanda, 2062 or National Drinking Water Quality Standards, 2005
Norway	Drinking water regulations; act related to planning and buildings
Rwanda	National water quality surveillance strategic plan; National Environmental health policy
Sudan (the)	Environmental health policy; Water and sanitation policy
Swaziland	National Environmental Health Policy
Syria	Drinking water policy
Togo	National political hygiene and sanitation Public Health Code (translation from French)
Uganda	The National Water Policy The National Environmental Health Policy The National Health Policy
United Republic of Tanzania	Draft environmental health policy; Draft Country Comprehensive Plan for Scaling Up Household Water Treatment and Safe Storage; National School WASH strategy