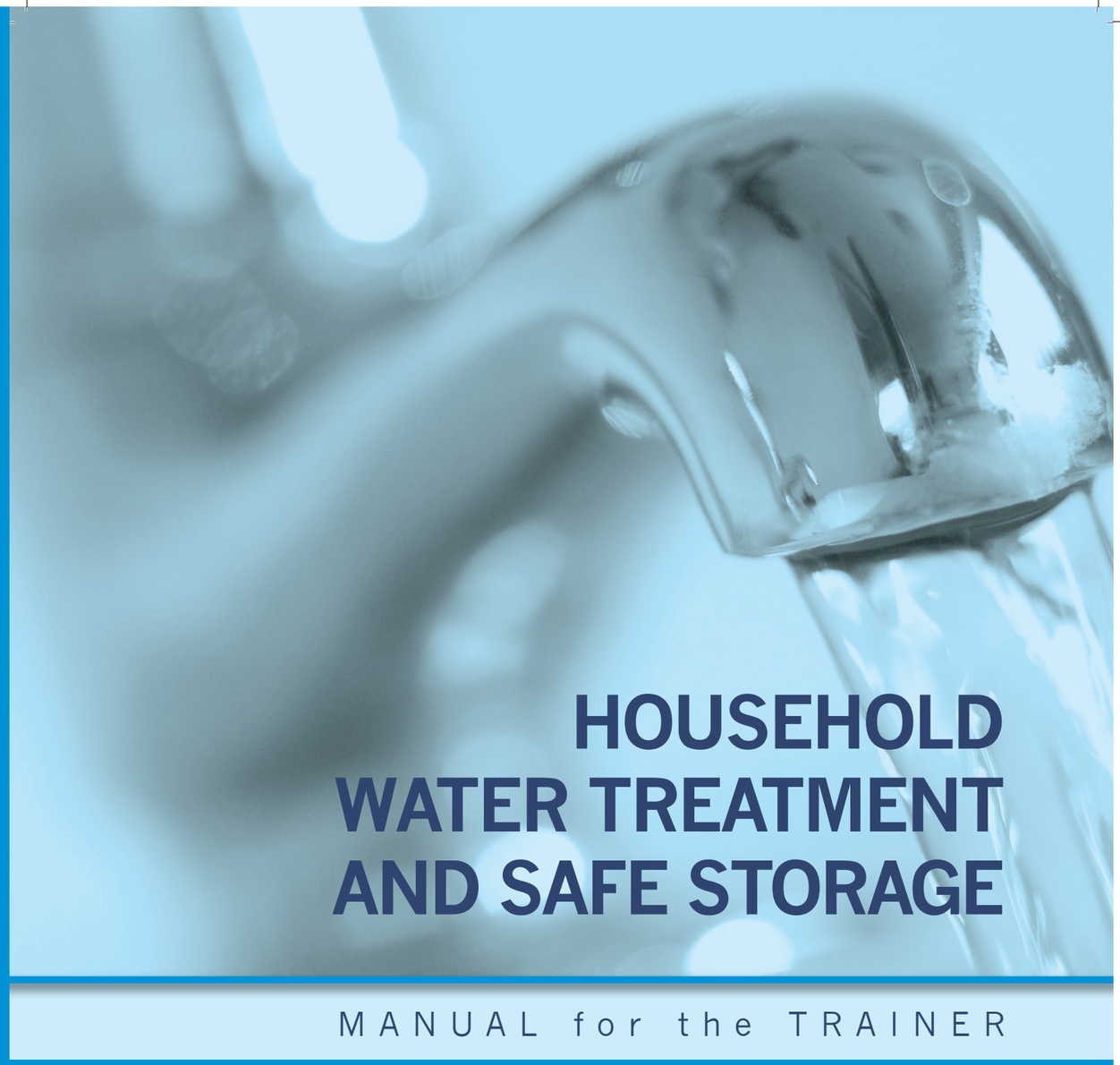

HOUSEHOLD WATER TREATMENT AND SAFE STORAGE

MANUAL for the TRAINER

World Health Organization
Western Pacific Region

ISBN-13 978 92 9061 616 0

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Household water treatment and safe storage (HWTS)
Manual for the trainer

TABLE OF CONTENTS

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The development of the *Trainer Manual* was initiated by the WHO Regional Office for the Western Pacific. The contribution of Laura Schulert (CAWST) in this process as well as the participation of the Department of Health of the Philippines, National Center for Rural Water Supply and Sanitation (NCERWASS) of Viet Nam and Ministry of Health and Ministry of Rural Development of Cambodia at three pilot workshops are gratefully acknowledged.

The *Trainer Manual* was reviewed by the following experts: Pat Lennon, Technology Portfolio Leader, PATH; Katharine McHugh, PSI; Arinita Maskey Shrestha, UNICEF Nepal; and Saminar Tabasum Panwhar, Emory University.

Many other organizations and individuals contributed in various ways to the manual. Their efforts and contributions are gratefully acknowledged, including generous financial support from the United States Agency for International Development, Japan Voluntary Contribution, WaterSHED, United Nations Children's Fund, and the World Bank Water and Sanitation Program.

FOREWORD

The World Health Organization (WHO) recognizes that the provision of safe water is an essential long-term goal to ensure the health and dignity of individuals, which will in turn yield economic benefits to them, their families and their communities. In addition to reducing poverty, safe water will contribute to other Millennium Development Goals, such as childhood survival and gender equality. Even with improved water sources, there is no guarantee that water will remain microbiologically safe as it is collected, transported and stored in the home. Hence, there is a need for interim intervention options to reduce the burden of diarrhoeal disease that can be caused by unsafe water. Household water treatment and safe storage (HWTS) is one such option as it can be immediately adopted at the point of use in homes, thus minimizing the risk of recontamination. It is an option that is being used even in areas with piped water supplies, as water supply interruptions occur and people store water, resulting in possible recontamination.

While there is growing global acceptance of HWTS, as well as recognition that it should be incorporated into country strategies to reduce the burden of disease, experience has also shown that there are different levels of capacity and understanding within countries. Thus, the WHO Regional Office for the Western Pacific launched an initiative to create awareness and encourage governments in Asia and the Pacific to support HWTS. After the pilot workshops in the Philippines (2009), Viet Nam (2010) and Cambodia (2011), it was realized that the training materials are relevant for governments in other regions.

This training material is targeted primarily at government officials, with the view that training workshops should be part of a national plan for the support and scale-up of HWTS. These training materials are made up of a *Trainer Manual,* which provides guidance on planning workshops, selecting trainers and participants, logistic arrangements, and other preparations for workshops. Lesson plans are also provided in the *Trainer Manual,* with guidance on participatory approaches and the use of the PowerPoint presentations that are included. A *Participant Manual* with five modules is also included.

The training materials may be adapted to suit the audience. As HWTS is relevant for other health initiatives, such as nutrition, maternal and child health, and HIV / AIDS, the wider application and dissemination of this training material is greatly encouraged as an option for improving the safety of water, especially among the vulnerable populations and the poor.

ACRONYMS – ABBREVIATIONS

alum	aluminium sulfate
C	concentration
CAWST	Centre for Affordable Water and Sanitation Technology
CBA	cost–benefit analysis
CDC	United States Centers for Disease Control and Prevention
CEA	cost-effectiveness analysis
CFU	colony-forming units
CI	confidence interval
DALY	disability-adjusted life years
DFID	United Kingdom Department for International Development
DHS	demographic and health surveys
Eawag	Swiss Federal Institute of Aquatic Science and Technology
E. coli	*Escherichia coli*
ENPHO	Environment and Public Health Organization
HIV/AIDS	human immunodeficiency virus/acquired immunodeficiency syndrome
HWT	household water treatment
HWTS	household water treatment and safe storage
HWWS	hand washing with soap
IEC	information, education and communication
IDE	International Development Enterprises
IRC	International Water and Sanitation Centre
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation
LRV	log reduction value
LSHTM	London School of Hygiene and Tropical Medicine
LSMS	Living Standard Measurement Study
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Surveys
Namsaat	National Centre for Environmental Health and Water Supply, Lao People's Democratic Republic

PAC	polyaluminium chloride
POUZN	Point-of-Use Water Disinfection and Zinc Treatment Project
PPP	public-private partnership
PSI	Population Services International
RDI	Resource Development International
RR	relative risk
SDC	Swiss Agency for Development and Cooperation
SODIS	solar water disinfection
SWS	safe water system
TDS	total dissolved solids
TTC	thermotolerant coliforms
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UV	ultraviolet
WHO	World Health Organization
WSP	Water and Sanitation Program

HOUSEHOLD WATER TREATMENT AND SAFE STORAGE

WORKSHOP INTRODUCTION

1. INTRODUCTION

This *Trainer Manual* was developed to support people who organize and facilitate workshops with central governments in the Western Pacific Region to introduce the need for household water treatment and safe storage (HWTS). It is based on the practical experiences of the World Health Organization (WHO), the Centre for Affordable Water and Sanitation Technology (CAWST) and the London School of Hygiene and Tropical Medicine (LSHTM). After the pilot workshops in the Philippines (2009), Viet Nam (2010) and Cambodia (2011), it was realized that the training is relevant for governments in other regions and can be used globally.

This introduction provides background on how and why the workshop was developed, tips to help organizers and trainers plan for a successful workshop, and several tools, such as checklists, lesson plans and PowerPoint presentations. The tools can be adapted to suit your style and the needs of the audience.

1.1 Background on household water treatment and safe storage

Having safe drinking-water is a fundamental human need and human right for every man, woman and child. People need clean water to maintain their personal health and dignity. Yet hundreds of millions of individuals live without clean water.

Providing safe water to the almost 1 billion people who currently lack access, and the millions more who still suffer from contamination of their improved water sources, has been recognized by WHO as an essential long-term goal that will yield great health and economic benefits.

HWTS lets people take responsibility for their own water security by treating and safely storing water themselves. It can be adopted immediately in the homes of poor and vulnerable families to dramatically improve their drinking-water quality. It is proven to be a cost-effective way to significantly improve health and prevent disease.

WHO works on aspects of water, sanitation and hygiene where the health burden is high, where interventions can make a major difference and where the present state of

knowledge is poor. WHO has produced several documents related to HWTS that validate the relationship between household water management and health. One such document, *Combating waterborne disease at the household level* (2007), made a strong case for managing water in the home to prevent diarrhoea and contributed to the rise in global acceptance of HWTS.

In addition to conducting research, WHO established, and now co-hosts with the United Nations Children's Fund (UNICEF), the International Network on Household Water Treatment and Safe Storage (the Network). The purpose of the Network as described in its Phase II (2011–2016) strategy is to "contribute to a significant reduction in water-borne and water-related vectorborne 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 includes those international, governmental and nongovernmental organizations, private sector entities, and academia that subscribe to the above mission. The four main areas of Network activity are: research, implementation and scaling up, creating an enabling environment, and monitoring and evaluation.

1.2 WHO and its collaborators

The WHO Regional Office for the Western Pacific is embarking on an awareness and education programme with governments in the Western Pacific Region to encourage their support of HWTS. This workshop is intended for central government officials in the Western Pacific Region who are mandated with the responsibility for providing water and sanitation for the poor in rural and urban areas. Central government plays a key role in scaling up HWTS by creating demand, ensuring a supply chain for HWTS products and supporting on-the- ground implementers.

The concept and development of this training workshop was led by the WHO Regional Office for the Western Pacific. Several collaborators created the participant and trainer manuals, including:

- ***Centre for Affordable Water and Sanitation Technology (CAWST)***

CAWST is a Canadian non-profit organization that provides technical training and consulting and also acts as a centre of expertise in water and sanitation for the poor in developing countries. Since 2001, CAWST's client network has worked in over 60 countries and helped 4.6 million of the most vulnerable people get access to better water and sanitation.

CAWST believes it is best to start by teaching people the skills they need to have safe water in their homes. CAWST transfers knowledge and skills to organizations and individuals in developing countries through education, training and consulting services. One of CAWST's core strategies is to make knowledge about water common knowledge. This is achieved, in

part, by developing and freely distributing education materials with the intent of increasing availability of knowledge to those who need it most. Further information about CAWST is available at: www.cawst.org

CAWST developed training material for Modules 1, 2 and 3 of this workshop.

- ***Dr Thomas Clasen, London School of Hygiene and Tropical Medicine (LSHTM)***

Dr Clasen joined the faculty of LSHTM in 2004. He has assisted in the evaluation of low-cost water treatment products in Bangladesh, Bolivia, Cambodia, Colombia, the Congo, the Dominican Republic, Ethiopia, Guatemala, India, Peru, Sierra Leone and Viet Nam. The evaluation protocols include microbiological effectiveness, disease impact, economic impact, acceptability, willingness to pay and sustainability.

Dr Clasen led a group that conducted a Cochrane Review on the effectiveness of improvements in the microbiological quality of drinking-water on diarrhoeal disease and the effectiveness of sanitation interventions to prevent diarrhoea. As well, he performed a cost-effectiveness analysis of water quality interventions for WHO. His research also includes the assessment of uptake, affordability, scalability and sustainability of water and sanitation interventions using public, nongovernmental organization (including microfinance), quasi-commercial (social marketing) and commercial models.

Dr Clasen developed training material for Modules 1, 4 and 5 of this workshop.

In addition, a number of individuals reviewed and provided important input into these manuals, including:

Pat Lennon, Technology Portfolio Leader, PATH

Katharine McHugh, PSI

Dr Margaret Montgomery, WHO

Arinita Maskey Shrestha, UNICEF Nepal

Saminar Tabasum Panwhar, Emory University

2. OVERVIEW

The four-day workshop described in this *Trainer Manual* gives central government officials the knowledge and tools needed to promote and support HWTS programmes. The training consists of five modules that address different aspects of HWTS.

- **MODULE 1 introduces** HWTS. It presents research and evidence on the effectiveness of HWTS for preventing diarrhoeal diseases, the economic impact of HWTS interventions, and scaling up HWTS interventions by achieving coverage and sustained uptake. It also discusses the need to target the most vulnerable populations and how HWTS contributes to achieving the Millennium Development Goals (MDGs).
- **MODULE 2 presents** different options for treating and storing water at the household level and demonstrates how to use different technologies that are locally available. Participants apply different tools to select HWTS options that are locally appropriate and discuss the role of government in technology selection.
- **MODULE 3 explains** the main components and requirements of successful HWTS implementation needed to achieve widespread coverage and uptake. Topics include creating demand, supplying products and services, monitoring and improvement, building human capacity, and programme financing. As well, case studies are included to illustrate the diversity of implementation approaches.
- **MODULE 4 focuses** on assessing the impact of HWTS. It explains direct and indirect impact assessment methods and the suitability of each under different circumstances. The module aims to highlight the challenges of measuring HWTS impact and suggests ways in which HWTS might realistically be measured by government. It also provides some examples to help governments in developing plans to assess the impact of HWTS programmes in their countries.
- **MODULE 5 discusses** the role of government in developing and implementing a national policy on HWTS to support implementation and scale-up.

2.1 Participatory learning

Participatory approaches are widely used to engage and actively involve everyone in the workshop. Effective learning often comes from shared experiences and participants learning from each other. Much of the course content is delivered through interactive presentations, case studies, demonstrations and group discussions.

3. WORKSHOP PLANNING

The following activities should be undertaken by workshop organizers to get started with planning and logistics.

3.1 Identify the planning team

Many decisions must be made and work done leading up to the workshop, and you will find it helpful to have a team to handle many of the details. The workshop planning team should include people who are:

- familiar with the workshop material,
- familiar with the government agencies that will be invited,
- knowledgeable about the training site.

3.2 Fit training into a broader plan

Training is just one element. This workshop makes the most sense when it is part of a government's broader plan to support HWTS. Providing follow-up and ongoing support to the government agencies involved is crucial to successfully implement the knowledge gained.

3.3 Select trainers

Effective trainers for this workshop should possess the following knowledge, skills and attitudes.

KNOWLEDGE – The lesson plans are designed for trainers who have expertise in the subject matter and knowledge regarding the background of the participants, including:

- the role of government and the challenges they face in providing safe water,
- water quality issues that are prevalent in country,
- the need for household water treatment and safe storage in the country,
- HWTS and its implementation in the context of the country.

SKILLS – This manual assumes that trainers are comfortable with group facilitation. An effective trainer uses various facilitation skills to:

- help people feel comfortable with a participatory approach,
- encourage people to share information, ideas, concerns and knowledge,
- help people to communicate clearly,
- manage group dynamics and resolve conflicts,
- keep the training practical and relevant.

ATTITUDES – Trainers should aim to create a positive learning environment for all participants. This is achieved in part by their approach and manner, such as being:

- friendly, open and approachable,
- objective,
- respectful,
- aware of cultural differences,
- gender sensitive.

Any multi-day workshop is a large undertaking. You may want to have several co-trainers to share the workload, especially if there is a large number of participants. It is recommended to have two trainers for every 20 participants. All trainers should be comfortable with the subject matter and have good facilitation skills.

It can also be helpful to have guest speakers, such as local HWTS implementers, to participate in the training. If the guest speakers have strong technical background or experience, the more likely they can help deal with practical issues and provide clear responses to questions. Always talk to your guest speakers beforehand about your expectations and be sure that they understand their role and time commitment.

3.4 Select participants

For the most effective workshop, it is important to take care in inviting participants by considering:

- ***Number of participants –*** It is important to choose the right number of people. You may want to have a small group to provide intensive training and support, or a larger group to have a wider range of participation. A common reason that training sessions fail to meet their objectives is that more people than planned are added to the participant list. A maximum of 20 participants is recommended so that everyone has the chance to fully participate in the training.

- ***Multiple participants from each government agency –*** The reason for training is to enable staff to put their knowledge into practice. This is most likely to happen when a critical mass of the government's staff is familiar with HWTS. Consider inviting staff responsible for planning and implementation, as well as their superiors.

- ***Intergovernmental counterparts –*** Staff from the ministry of health, the ministry of rural development, the ministry of environment and the ministry of public works (or equivalent) who will be involved in planning or implementing HWTS will benefit from the workshop. Coordination is better when intergovernmental counterparts are using the same concepts and methods.

As well, trainers should be clear about whom they will be training before the workshop begins. Understanding the audience is an essential first step to facilitating a successful workshop. The following questions will help trainers conduct a needs assessment of their participants. The information will help them adapt the content of the workshop if necessary and select relevant learning aids:

- Why are the participants attending? Is it their own choice or has a superior instructed them to be present?
- What are their learning expectations?
- What range of experience is likely to be represented?
- Do they have any biases against you or your organization?
- What prior knowledge and experience might they have about HWTS?

A pre-workshop questionnaire can be used to help trainers better understand the background of their participants and their expectations. It is often the case that participants do not complete the questionnaire in advance. The planning team may need to follow up with participants to encourage them to submit their responses.

In the absence of such information, the workshop opening includes time for trainers to help determine the participants' prior knowledge, experience and learning expectations; and they may need to be flexible in adapting the workshop agenda to meet their needs.

See *Trainer Manual,* Appendix 1 for an example of a pre-workshop questionnaire.

3.5 Identify the workshop host

The organization or government that hosts the workshop has a number of responsibilities, from helping with selection of the venue to planning extracurricular events. The advantage of hosting is that more staff may be able to participate in the workshop, since travel is not an issue.

3.6 Identify local and regional implementers

Local and regional implementers, manufacturers and distributors of HWTS products should be invited to participate in the workshop. This can help build bridges among the various players and engender government support for innovative implementation approaches, such as social marketing.

Implementers and manufacturers can also help discuss and demonstrate the various local HWTS technologies, as well as their implementation programmes. If you plan to have them present, then it is good to meet with the individuals in advance and discuss how much time they have and the topics that you would like addressed (e.g. cost, operation and maintenance, creating demand, supply chain requirements, monitoring, building capacity, and programme financing). PowerPoint presentation templates are also included with the lesson plans to help guide the implementers with creating their individual presentations and to ensure consistency of the information shared.

The logistics (e.g. invitations, transportation and accommodations) and a budget to bring in local implementers will have to be discussed with and arranged by the WHO country office and the local organizing committee. Logistics will be different in each country and likely each time that the workshop is conducted. These discussions should be initiated at the time the workshop dates and location are selected.

3.7 Logistics management

The planning team will need to determine workshop logistics such as:

- What is the workshop budget?
- Who will handle pre-workshop communication with the participants?
- Who will coordinate and who will carry out local logistics?
- Who will manage participant travel?
- Who is responsible for pre-workshop registration?
- Who is responsible for on-site registration?

4. WORKSHOP PREPARATIONS

There are several things that organizers and trainers will need to do to get ready for the workshop.

4.1 Roles and responsibilities

It is essential that the team works well together. The organizers and trainers should meet before the workshop to assign roles and responsibilities. It is also useful to clarify the role of the other trainers when they are not actually conducting a workshop session: are they assisting in the group work? Are they available to answer questions? Are they setting up for the next session? Where possible, ensure that all the trainers can be present for the entire workshop.

4.2 Understanding the local context of HWTS

Trainers should meet with the organizers and government beforehand to determine their current position and policies on HWTS, if any. Relevant information should be incorporated into the content of the workshop so that it is relevant and meaningful for the participants. In particular, trainers will need to add specific information to the country PowerPoint slides in advance of the workshop (see following lesson plans for more information).

4.3 Translations and interpreters

The materials may need to be translated and an interpreter may be required if the participants do not speak English as their first language. It is common for participants to overstate their English comprehension. This is often out of embarrassment and not wanting to look bad in front of their colleagues. If there is any doubt, translate all of the training materials and use an interpreter for the workshop to make sure that all participants have equal opportunity to fully understand the content.

Using an interpreter takes more time than if the workshop is being delivered in one language. The organizers and trainers will have to adjust the workshop agenda to account for the extra time required. Some of the content and activities will need to be reduced or an extra half-day added to the agenda.

Some tips for working with an interpreter include:

- Try to find an experienced interpreter who is known and trusted by the organizer.
- Give him a copy of the training materials to review in advance of the workshop, including the *Participant Manual, Trainer Manual* and PowerPoint presentations.
- Meet at least one day before the workshop to discuss their role, review the agenda and learning activities, and ensure that they understand the content and key vocabulary.
- Practise using microphones and headsets if simultaneous interpretation is going to be used.
- Ask them to write out the flip chart headings in the local language in advance.
- Include them in the end-of-day debriefings and ask for their feedback.

4.3 Room set-up

If possible, visit the training site before the participants are due to arrive and set up the electrical equipment and materials. Try to identify potential sources of distraction in the room, both to yourself and participants, and make changes to mitigate them.

Seating arrangements have a big influence on the training. It is recommended to arrange the tables and chairs so that participants can make eye contact with one another and can break into small groups easily. Participants will also need to be able to view the speakers, the PowerPoint slides and the flip chart posters.

4.4 Equipment and materials

The organizer will need to gather and bring the following materials and equipment to the workshop.

Equipment

- ✓ Computer
- ✓ LCD projector
- ✓ Extension cord(s)
- ✓ Camera

Materials

- ✓ Name tags
- ✓ Markers
- ✓ Pens

- ✓ Paper
- ✓ Flip chart or large pieces of paper
- ✓ Tape
- ✓ Post-it notes
- ✓ Straws (20)
- ✓ Paper plates (5)

HWTS options for demonstration

- ✓ Locally available sedimentation options – e.g. alum, cactus, moringa seeds)
- ✓ Locally available filtration options – e.g. biosand filter, ceramic pot filter, ceramic candle filter, membrane filter
- ✓ Locally available disinfection options – e.g. chlorine products, solar water disinfection (SODIS) bottles
- ✓ Locally available safe storage containers
- ✓ Clear containers to demonstrate sedimentation (4)
- ✓ Other containers to store water (10)
- ✓ Turbidity samples (0 NTU, 50 NTU, 100+ NTU)
- ✓ Turbidity tubes
- ✓ Chlorine test strips
- ✓ Local water samples to demonstrate how to use the options

4.5 *Participant Manual*

The organizer will need to decide where and when the *Participant Manual* will be reproduced and collated, and who will manage the production.

The *Participant Manual* includes the modules that participants will need during the workshop. In addition to the *Participant Manual*, the trainer should include the course outline and agenda. All PowerPoint slides for workshop presentations are provided on CD. The trainer, upon adapting the slides for a particular training workshop, may wish to consider reproducing these as handouts so that participants do not need to take notes during the presentations. It would be helpful for some participants who do not have a strong grasp of English to read the materials in advance of the workshop.

The organizer and trainer will also need to determine if any adjustments to language, concepts or materials are required based on the participants' need assessments.

4.6 PowerPoint slides

This workshop includes a series of PowerPoint presentations that can be used as a learning aid. Much of the content of the workshop is described in detail in the speaker notes that are part of the PowerPoint slides.

To use them fully, the trainer should print and study the speaker notes pages along with the lesson plans to help prepare in advance. The speaker notes are an almost verbatim text for a sample presentation. The notes provide the background and detail that the trainer needs to understand the content and the order for the presentation. The notes should *not* be read aloud during the presentation. Rather, the trainer will want to become familiar with the material, prepare his or her own brief notes and practise speaking with the slides.

Several of the presentations include slides for introducing or explaining the participatory activities. The speaker notes explain when to display these so that participants can refer to them during their individual or small group work. The trainer may want to alter or reorganize some of the slides. This is best done prior to printing the handouts for the participant binders. Keep in mind that if you add or delete slides, the slide numbers will change, shifting the content in the lesson plans. If changing the slide format or design, please take care to retain the embedded logos that indicate workshop authors.

The trainers will need to add information to the country-specific PowerPoint slides in advance of the workshop. There are also optional PowerPoint slides that the trainer will need to select depending on the audience.

5. DESIGN OF THE WORKSHOP

This section explains the workshop agenda and individual sessions that have been developed to meet the participant learning expectations.

5.1 Learning expectations

The following learning expectations list what the participants will be able to do by the end of the workshop to demonstrate increased knowledge, improved skills or changes in attitude. Each module and lesson plan refers to the specific learning expectations.

- **MODULE 1**
  Introduction to HWTS

- **MODULE 2**
  Water contamination and HWTS options

- **MODULE 3**
  Implementation of HWTS

- **MODULE 4**
  Assessing the impact of HWTS

- **MODULE 5**
  The role of government in HWTS

MODULE	LESSON PLAN	Topic	Expectation
–	1	**Workshop introduction**	• Make acquaintances with the organizers, trainers and participants • Describe the learning expectations for the workshop • Establish a group agreement for appropriate behaviour and how participants are expected to learn together during the workshop
1, 2	2	**Water quality and health connection**	• Identify common drinking-water contaminants and diseases in the country • Discuss the connection between water quality and health • Explain the difference between improved and safe drinking-water • List the five steps in the multi-barrier approach for safe drinking-water
1	3	**Introduction to HWTS**	• Discuss the research and evidence on HWTS in terms of: – HWTS and the Millennium Development Goals (MDGs) – preventing diarrhoeal diseases – economic benefits – realizing the potential of HWTS
2	4	**Sedimentation**	• Describe different sedimentation options, including settling and coagulation
2	4	**Filtration**	• Describe different filtration options, including straining through a cloth, biosand filters, ceramic pot filters, ceramic candle filters and membrane filters
2	4	**Disinfection**	• Describe different disinfection options, including chlorination, solar water disinfection (SODIS) and boiling
2	4	**Safe water storage**	• Discuss the issues of stored water quality • Describe how to protect stored water and prevent it from recontamination
2	5	**HWTS technology selection**	• Discuss the HWTS technology selection process • Identify criteria to select appropriate household water treatment technologies and safe storage options • Discuss the role of government and community in the selection of HWTS technologies

MODULE	LESSON PLAN	Topic	Expectation
3	6	**Implementation of HWTS**	• Discuss the three components of implementation: creating demand, supplying products and services, monitoring and improvement • Discuss the roles and human capacities needed for successful implementation • Discuss the need for programme financing • Discuss the variety of approaches that are used by different implementers
4	7	**Assessing the impact of HWTS**	• Discuss the differences between direct and indirect assessment of the health impact of HWTS • Explain the challenges in undertaking direct health impact studies • Describe the three key areas of focus for indirect assessment of HWTS • Discuss appropriate data collection methods and indicators for use in an HWTS impact assessment
5	8	**The role of government in HWTS**	• Evaluate the need for and potential contribution of HWTS to government health and development priorities • Identify the possible roles for government to support HWTS • Identify the key elements of a national strategy or action plan for HWTS • Develop an action plan detailing the next steps required for government officials at all levels to begin developing and implementing a national HWTS strategy
–	9	**Workshop closing**	• Recognize all that was learnt through the workshop • Complete a self-assessment for learning and reflection • Review learning expectations to see if they were met • Complete a final evaluation of the workshop • Hand out certificates and deliver closing speeches

5.2 Workshop agenda

The general framework of the workshop is as follows:

- ***Workshop opening and introductions***

To welcome people and allow participants and trainers to get to know one another.

- ***Individual sessions***

To focus on a selected topic. Each individual session includes an introduction, a main lesson and a closing activity to review the content.

- ***Breaks and lunch***

To keep people working and feeling positive, breaks are needed. Plan for mid-morning and mid-afternoon breaks that allow people to use the washroom, take a drink or eat a snack. While planning your workshop, it is also important to clarify with participants in advance as to whether or not food and snacks will be provided.

- ***End-of-day review***

To gain feedback from the participants and to clarify any areas of uncertainty.

- ***End-of-workshop closing***

The end of the workshops can be official or unofficial depending on what is appropriate. Certificates are typically handed out.

- ***End-of-workshop evaluation***

To allow participants to assess the strengths and weaknesses of the workshop for further improvement.

- ***Organizer and trainer(s)' debriefing***

To discuss what went well, what areas of the workshop can be improved and what needs to be done in future. Debriefings are usually held at the end of each day and at the end of the workshop.

See *Trainer Manual,* Appendices 2–4 for "Participant self-evaluation", "End-of-day evaluation" and "Final evaluation" questionnaires.

PARTICIPANT AGENDA

Time	DAY 1	DAY 2	DAY 3	DAY 4
1 h 30 min	**Workshop opening** • Welcome by WHO and host • Introductions • Group agreement • Participant expectations • Agenda and objectives • Participant self-assessment	**Review of DAY 1** Introduction to HWTS option: • *Filtration*	**Review of DAY 2** Implementation of HWTS	**Review of DAY 3** Role of government
15 min	*BREAK*	*BREAK*	*BREAK*	*BREAK*
1 h 30 min	Water quality and health connection Multi-barrier approach and HWTS	Introduction to HWTS option: • *Disinfection*	Implementation of HWTS	Role of government
1 h	*LUNCH*	*LUNCH*	*LUNCH*	*LUNCH*
1 h 30 min	Making the case for HWTS	Introduction to HWTS option: • *Safe storage* HWTS technology selection • *Criteria for evaluation*	Impact assessment	Role of government
15 min	*BREAK*	*BREAK*	*BREAK*	*BREAK*
1 h 30 min	Introduction to HWTS options • *Sedimentation* **End-of-day review**	HWTS technology selection • *Role of government* **End-of-day review**	Impact assessment **End-of-day review**	**Workshop closing** • Review participant expectations • Participant self-assessment • Certificates and group photo • Workshop evaluation

Trainer detailed agenda – Day 1

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Workshop opening** • Welcome by WHO and host • Introductions • Group agreement • Participant expectations • Agenda and workshop objectives	• Objective is to create a common base of understanding and knowledge of best practices in HWTS implementation and help government identify its role in supporting HWTS. • Learn through practical and shared experience. • Mixture of presentations, open discussion, and individual, small- and large-group activities. • All materials are in *Participant Manual* and CD.
15 min	*BREAK*	
1 h 30 min	**Water quality and health connection** • Activity to make the water quality and health connection • Presentation on different pathogens and diseases • Activity to identify the multi-barrier approach • Presentation on the multi-barrier approach • Discussion on what participants already know about HWTS (*optional*) • Presentation on HWTS	• Three water quality considerations: biological, chemical and physical. • Types of biological pathogens—bacteria, virus, protozoa and helminths. • A pathogen is any organism that causes disease. • Majority of water-related diseases are caused by pathogens. • Water treatment should focus on removing pathogens since they are the largest public health threat. • Difference between safe and improved water. • Each step in the multi-barrier approach provides an incremental health risk reduction, parallel to water safety plans. • HWTS follows same process as community treatment systems, only difference is that it uses technologies that can be applied in the home. • Although HWTS is not new, its recognition as a key strategy for improving public health is just emerging.
1 h	*LUNCH*	

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Introduction to HWTS** • Presentation and discussion questions • Activity on potential benefits and impacts of HWTS	• Evidence suggests that HWTS has the potential for significant health impact. • Evidence suggests that HWTS is highly cost-effective in all settings. • However: – resources should not be diverted from improving water supply infrastructure, – there remain questions regarding the true effect of HWTS. • To realize its full impact, HWTS will need to ensure coverage, performance and adoption.
15 min	*BREAK*	
1 h 30 min	**Introduction to HWTS option:** **— *Sedimentation*** • Review the multi-barrier approach • Participants identify different HWTS options that are currently being used in their country • Small groups or implementers lead sedimentation demonstrations and presentations, using videos where appropriate **Review**	• Sedimentation removes large particles and at the same time up to 50% of pathogens. • Participants have opportunity to share their experiences and understanding of HWTS. • Participants become experts in individual technologies and learn more if they teach others. • Participants are able to see all sedimentation options in action.

Trainer detailed agenda – Day 2

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Opening (15 min)** • Review DAY 1 activities **Introduction to HWTS option:** **– *Filtration*** • Small groups or implementers lead filtration demonstrations and presentations • Use videos where appropriate	• Filtration removes smaller particles, protozoa and helminths, and more than 90% of bacteria and viruses. • Participants have opportunity to share their experiences and understanding of HWTS. • Participants become experts in individual technologies, learn more if they teach others. • Participants are able to see all filtration options in action.
15 min	*BREAK*	
1 h 30 min	**Introduction to HWTS option:** **– *Disinfection*** • Small groups or implementers lead disinfection demonstrations and presentations • Use videos where appropriate	• Disinfection kills or inactivates 100% of remaining pathogens (assuming all previous steps have been taken). • Participants have opportunity to share their experiences and understanding of HWTS. • Participants become experts in individual technologies, learn more if they teach others. • Participants are able to see all disinfection options in action.
1 h	*LUNCH*	

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Introduction to HWTS option:** **– *Safe storage* (30 min)** • Presentation • Show examples of different locally available storage containers. Discuss if any modifications can be made to improve the container designs **HWTS technology selection (1 hour)** • Large group activity to identify different criteria for evaluation using car example • Small group activity to evaluate HWTS options for a local context using different criteria	**Safe storage** • Safe storage prevents recontamination. • Safe storage includes appropriate containers and handling practices. • Key criteria for safe storage container design. **HWTS technology selection** • There is no "best" technology for HWTS; there are many HWTS options, and they all have advantages and limitations. • A technology should always be evaluated within the context of its implementation. • There are many criteria to consider for the local context, including treatment effectiveness for the water source, appropriateness, acceptability, affordability and implementation requirements. • There is no one right way to make decisions about HWTS selection. There are systematic tools to evaluate technologies, but decisions are often made pragmatically based on the information and resources available.
15 min	*BREAK*	
1 h 30 min	**HWTS selection** • Small group presentations and discussion • Presentation and discussion on the role of government **Review**	• Government should ensure that different HWTS products are available in the marketplace. • Government provides households and implementers with the freedom to make their own decisions and to choose the options that best suit them.

Trainer detailed agenda – Day 3

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Opening (15 min)** • Review DAY 2 activities **Implementation of HWTS** • Presentation to introduce implementation framework and five components, using brief examples • Case studies presented by three local implementers to illustrate different approaches (e.g. social marketing, commercial marketing and government institutionalization) • Small group discussion on case studies	• There is no standard approach for getting HWTS into people's homes. There are a variety of organizations implementing different HWTS options in different ways. This level of complexity makes it difficult to simplify implementation into typical approaches. • All components of the HWTS implementation framework are essential for a successful programme—none of them can be neglected. • The goal is to increase capacity and ownership at every level.
15 min	*BREAK*	
1 h 30 min	**Implementation of HWTS** • Small group review activity for each component	• Awareness and education are needed to create demand and convince households of the need and benefits of HWTS. • Households need both the product and support services to ensure the proper and consistent use of HWTS over the long term. • HWTS options can be divided into consumable and durable products. Consumable products require an uninterrupted and long-term supply chain, and their recurrent costs should not be subsidized. For durable products, the capital cost may require partial subsidies to make it affordable. • The key to successful monitoring is to keep it simple and within the means of the organization. • Developing the individual's knowledge and skills is part of building the overall organizational capacity required for implementation. • A variety of roles are needed to implement HWTS programmes, including programme implementers, community health promoters, trainers and other stakeholders.

Time	ACTIVITIES	KEY MESSAGES
	continued	• Implementers need consistent and long-term funding to ensure their programme activities are executed without disruption. Costs are highly programme specific, and implementers often need a combination of funding sources to cover their expenses.
1 h	*LUNCH*	
1 h 30 min	**Impact assessment** • Introduction activity to define impact • Activity to identify possible direct and indirect impacts from HWTS • Activity to discuss the challenges of measuring direct health impacts • Activity to learn how to measure indirect impacts, including good indicators and realistic data collection methods • Optional activity on how to take a representative sample of a population	• There are three main approaches to assess the impact of HWTS: – using previous studies as evidence, – direct health assessments focusing on health improvements, – indirect impact assessments focusing on coverage, performance and adoption. • A rigorous assessment of the direct health impact of an intervention is exceedingly difficult, time-consuming and costly. Studies to assess the direct impact on health should not be undertaken without extensive involvement of experienced epidemiologists and having the time, funding and other resources necessary to conduct them. • There is a large amount literature that documents the impact of different HWTS options in many different circumstances, which can be used to assess impact. • New local evaluations should only be considered if there is strong evidence to doubt the relevance or reliability of studies performed elsewhere. • Impact of HWTS is greatest when targeted towards vulnerable populations, such as those with: – increased vulnerability due to undeveloped or impaired immune systems, – high exposure to microbiologically contaminated water. • Indirect assessment of the health benefits of HWTS should be made by focusing on the three general conditions critical to achieving the greatest potential impact of HWTS: – *coverage:* ensuring that HWTS is targeting the appropriate population – *performance:* ensuring that the method used is safe and microbiologically effective – *adoption:* ensuring correct, consistent and sustained use. • In order to make assessments easier, it is possible to use indicators that serve as substitutes for the many outcomes of interest to HWTS programmes, such as water quality and actual use. • Like other scientific studies, an impact assessment for HWTS should be carefully planned in advance and then undertaken in accordance with a written protocol.
15 min	*BREAK*	
1 h 30 min	**Impact assessment** • Small group activity to practise developing their own protocol for a HWTS impact assessment • Review	

Trainer detailed agenda – Day 4

Time	ACTIVITIES	KEY MESSAGES
1 h 30 min	**Opening (15 min)** • Review DAY 3 activities **Role of government** • Introduction activity to emphasize the importance of government in supporting successful HWTS implementation • Small group activity to discuss what role HWTS should have in the country	• Government has an essential role and significant responsibilities in optimizing the impact of HWTS. • Developing a national strategy and action plan for HWTS should be done taking into account existing conditions and other public health priorities in the country. • Government should target areas and populations where HWTS will be most applicable and successful. • HWTS should not divert resources away from long-term government efforts to provide sustainable access to safe drinking-water, including piped water supply.
15 min	*BREAK*	
1 h 30 min	**Role of government** • Small group activity to discuss what role government should have in HWTS, broken down for different levels of government • Small group activity to review a country's national action plan for HWTS • Optional activity for the participants to develop their own national action plan for HWTS	• There is value in ensuring that a national strategy and action plan for HWTS reflect the experience and lessons learnt from others. In several countries, this has been accomplished by organizing a national workshop on HWTS to bring the stakeholders together. • If implementation has been considered at every step of strategy development, then it will greatly help in putting the plan into action. • Effective implementation of HWTS involves a variety of ministries, agencies, authorities and research institutions within government, as well as the participation of nongovernmental organizations and the private sector. Government has an important role in bringing together and coordinating the efforts of all these stakeholders. • The government has a role in monitoring progress in the implementation of its HWTS strategy, as well as coordinating efforts to ensure it meets its goals.

Time	ACTIVITIES	KEY MESSAGES
1 h	*LUNCH*	
1 h 30 min	• Small and large group activity to identify actions and responsibilities to be taken after the workshop	• Participants should be motivated to commit to individual and group action after the workshop. • Clearly defined actions and responsibilities will be shared with the group.
15 min	*BREAK*	
1 h 30 min	**Workshop closing** • Review all topics covered • Complete end-of-workshop self-assessment to gauge individual learning • Review group learning expectations to see if they were met • Complete a final evaluation of the workshop • Deliver closing remarks and pass out certificates	• Demonstrate how much participants have learnt over the course of the workshop. • Leave the workshop feeling motivated to take individual action as a result of the learning.

5.3 Lesson plans for individual sessions

Experienced trainers know that no two workshops are alike. The following lesson plans are written for trainers and provide suggested activities and learning aids for each session. As long as the participant learning expectations are achieved, please feel free to adapt the lesson plans to match your individual style and the needs of the particular audience. Each lesson plan is structured and formatted with the following components:

Learning expectations

Describes what the participants will be able to do by the end of the session to demonstrate increased knowledge, improved skills or changes in attitude. Each lesson plan should reference the overall learning expectations listed in Section 5.1.

Time

The clock symbol appears next to the amount of time the session may take. This is an estimate and the session may be longer or shorter depending on how you facilitate it.

Materials

Lists all the materials that will be required for the session.

Preparation

The clipboard appears when there is preparation that needs to be done prior to the session. Scan the lesson plan for any preparation symbols before facilitating the session.

Key points

The key appears when there are important points and topics to discuss. These are reminders of what key points the participants should understand by the end of the session.

Trainer notes

The exclamation point appears to warn you of things to consider during the session.

Information

The question mark appears when you are introducing a new topic or checking for learning. What do the participants already know? What have the participants retained? What do they think?

See *Trainer Manual,* Appendices 2–4 for "Participant self-assessment ", "End-of-day evaluation" and "Final workshop evaluation" questionnaires.

LESSON PLAN
Workshop introduction 1

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Make acquaintances with the organizers, trainers and other participants.**
2. **Describe their learning expectations for the workshop.**
3. **Establish a group agreement for appropriate behaviour and how participants are expected to learn together during the workshop.**
4. **Complete a self-assessment of their current knowledge of HWTS.**

1 HOUR 30 MINUTES

MATERIALS

- ✓ Computer and projector
- ✓ PowerPoint: *Workshop introduction*
- ✓ *Participant Manual* (1 per person)
- ✓ Large country map
- ✓ Name tags and tent cards (1 per person)
- ✓ Small pieces of paper
- ✓ Participant self-assessment (1 per person)
- ✓ First day evaluation (1 per person)
- ✓ Flip chart paper
- ✓ Tape
- ✓ Markers
- ✓ Pens (1 per person)
- ✓ Post-it notes

PREPARATION

- ✓ Add workshop name, names of collaborating organizations and trainer(s)'name(s) to PowerPoint slides
- ✓ Write "Group agreement" on a piece of flip chart paper
- ✓ Write "Your expectations" on a piece of flip chart paper
- ✓ Write "Parking lot" on a piece of flip chart paper
- ✓ Print a large map of the country and post it on the wall. Prepare small pieces of paper or Post-it notes for participants to write down HWTS programmes in the country
- ✓ Print copies of the *Participant Manual* and appendices (1 per person)
- ✓ Print PowerPoint presentations with notes (*optional*) (1 per person)
- ✓ Print "Participant self-assessment" found in *Trainer Manual,* Appendix 2 (1 per person)
- ✓ Print "End-of-day evaluation" found in *Trainer Manual*, Appendix 3 (1 per person)
- ✓ Put a *Participant Manual*, tent card, name tag, marker, pen, small pieces of paper and "Participant self-assessment" at each seat

AS PARTICIPANTS ENTER THE ROOM

1. Pass out Post-it notes or small pieces of paper for participants to write down HWTS programmes of which they are currently aware. Specific information should include: city/region, type of HWTS option (e.g. biosand filters, chlorine) and implementing organization.
2. Ask the participants to post the notes on the large country map. Tell them that it will be discussed later in the workshop.
3. Ask participants to complete a self-assessment while waiting for everyone to arrive. Collect the self-assessments at the break and summarize the results after lunch.

INTRODUCTIONS

1. Show **Slide No. 1** when participants enter the room and during the workshop introduction.
2. The first speaker (a representative of WHO or host organization) introduces himself or herself and welcomes participants and guests. The speaker can make brief introductory remarks, such as why WHO prepared this workshop and its expectations. As well, the speaker can give a brief overview of household water treatment and safe storage (HWTS) in the particular country (e.g. key meetings, reports and guidelines).
3. The speaker briefly introduces each of the collaborating organizations. **(Slide No. 2)**
4. This speaker introduces each of the workshop trainers. **(Slide No. 3)**
5. The trainer leads an icebreaker activity to help participants meet each other and introduce themselves to the group. **(Slide No. 4)**
6. Ask participants to describe three interesting facts about themselves to a partner.
7. After five minutes, bring the participants back into the group. Ask one of the trainers to demonstrate a brief introduction to the large group, including his or her name, role and organization.
8. Call on one of the partners to begin. Continue around the room until all partners have introduced each other. Gently keep participants to brief introductory words.

GROUP AGREEMENT—SETTING GROUND RULES

1. Use **Slide No. 5** to introduce "Setting ground rules". Explain these are expectations created by the group that will guide the workshop activities and allow participants to learn together.
2. Ask participants to think about their favourite training or learning experience. What made that experience so positive? You can also ask for people to talk about a negative learning experience and what made it a bad experience.
3. Ask participants to suggest ways to create a positive learning environment for everyone. Check to see if all participants agree with what has been said. Record the agreed upon expectations on the "Group agreement" flip chart. If nothing is forthcoming from the participants, you may provide some suggestions, such as:

- Respect what other people say.
- Only one person to speak at a time—avoid side conversations.
- It is OK to ask questions if you do not understand.
- Turn off cell phones during the session.
- Workshop schedule—write down start, break, lunch, break and closing times.

4. Appoint a timekeeper to help remind you when it is time for a break or lunch.
5. Ask if anyone's expectations have been left out and write any additional points on the list.
6. Post the ground rules in a visible location for the entire session. Conclude by saying that these are the group's expectations for working together. It is OK to add to the ground rules if other suggestions are brought forward later on during the session.

Refer back to the ground rules if the group or an individual is not meeting the expected behaviour during the workshop.

PARTICIPANT EXPECTATIONS

1. Ask the participants to think for one minute and write down two learning expectations on the back of their name card.
2. Use **Slide No. 6** to ask the participants to describe their expectations and what they hope to learn during the training.
3. Write participant expectations on the "Your expectations" flip chart.
4. Affirm the expectations that you will be covering during the workshop.
5. Introduce the "Parking lot" flip chart. Explain when interesting topics or questions arise that are not directly relevant to the topics, they will be recorded on the "Parking lot" to be addressed at a more appropriate time.

WORKSHOP OBJECTIVES

1. Review the course outline and main objectives of the workshop. The key objective is to increase the capacity of government by creating a common base of understanding and knowledge of best practices in HWTS implementation by:
   - discussing the role of HWTS in providing safe drinking-water in the country,
   - describing different HWTS options in terms of effectiveness, appropriateness, acceptability and cost,
   - identifying the key components of successful implementation programmes,
   - discussing the role of impact assessments,
   - discussing the role of government in supporting HWTS implementation.
2. Review the overall agenda for the workshop. Return to the "Your expectations" flip chart and point out the relationship of expectations with the objectives—and those expectations that will and will not be met during the workshop. Offer other resources and alternatives for those topics that will not be covered (e.g. further information section of *Participant Manual*, web sites, research papers and other organizations).

3. Explain how participants will be asked to complete a brief evaluation each day and a final evaluation at the end of the workshop. Participants will be asked to assess the extent to which they feel you have been able to meet each of these objectives. Their feedback will be used to help improve the workshop so that it better meets their needs.

WORKSHOP FORMAT

1. Explain how the workshop was designed to encourage participant interaction. While a certain amount of information will be conveyed through presentations, every session will include participatory activities, such as:
   - individual and group activities,
   - case studies and learning from the experience of others,
   - open discussion, questions and answers.
2. Explain that participants can submit questions to the trainer during the breaks or lunch. This is especially helpful for workshops that are not conducted in the participant's language and gives the trainer time to translate the questions before responding.
3. Explain the layout of the *Participant Manual*, including the different modules and where participants can find key information.
4. If appropriate, discuss that while English is the language of the workshop, it is not everyone's first language. Both trainers and participants will need to speak slowly and clearly and be patient in trying to understand one another. Tell participants to please speak up if they need any trainer or participant to repeat something or to speak more clearly.
5. Ask the host organization to discuss any workshop logistics that need to be addressed. Remember to discuss:
   - building layout,
   - bathrooms,
   - emergency exits,
   - first aid.
6. Ensure that every participant has a manual with the workshop materials. Ask participants to look through their manuals with you. Point out and explain:
   - workshop agenda including: agenda highlights, start and end times, breaks and lunch;
   - organization of the materials, including the five modules and appendices;
   - handouts with PowerPoint slides, so that participants do not need to copy the slides, but can add their own comments; and
   - resource materials.
7. Remind participants to finish their self-assessments and submit them during the break. Tell them that it is not a test, but a way for the trainers to measure their base knowledge and check for learning at the end of the workshop.

OPTIONAL—Take group photo if there are officials participating in the opening session and leaving afterwards. Otherwise take the photo at the end of the workshop.

LESSON PLAN
Water quality and health connection 2

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Identify common drinking-water contaminants and diseases in the country.**
2. **Discuss the connection between water quality and health.**
3. **Explain the difference between improved and safe drinking-water.**
4. **List the five steps in the multi-barrier approach for safe drinking-water.**

1 HOUR 30 MINUTES

MATERIALS

✓ Computer and projector
✓ PowerPoint: *Water quality and health connection*
✓ Flip chart paper
✓ Markers
✓ Tape

PREPARATION

✓ Review Modules 1 and 2 in the *Participant Manual.*
✓ Research and add country-specific diarrhoeal disease epidemiology information to **Slide No. 14**.
✓ Write: "Contaminants and diseases" as the title of two columns on a piece of flip chart paper.
✓ ***Optional***. Write different contaminants and diseases on small pieces of paper to stick to the flip chart. If needed, ask the interpreter to translate the text in advance.

INTRODUCTION

1. Show **Slide No. 1** to introduce the new topic. Use **Slide No. 2 t**o describe the objectives of this session.
2. Tell participants that they can refer to Modules 1 and 2 in their *Participant Manual*.

Making the connection between local water quality and health

OPTION (depending on time)—Divide participants into groups of four to six people to discuss the questions on **Slides No. 3** and **No. 4**.

1. Show **Slide No. 3**. Ask participants what are common drinking-water quality contaminants in their country. Ask them if the contaminants are localized to a particular region or if they occur during a particular time of year. Record responses on the "Contaminants and diseases" flip chart paper.

To save time, prepare answers on small pieces of paper in advance and stick to the flip chart as the answers are given. Or ask participants to write the answers themselves on small pieces of paper and then stick them to the flip chart paper.

2. Show **Slide No. 4.** Ask participants what are the common water-related diseases in their country. Ask them if the diseases are localized to a particular region or if they occur during a particular time of year. Record responses on the "Contaminants and diseases" flip chart paper. To save time, prepare answers on small pieces of paper in advance or ask participants to write the answers and then stick to the flip chart paper.

3. Pick one of the diseases identified and ask participants what causes it. Draw a line connecting the contaminant to the disease, using different colours for biological and chemical contaminants. If diseases are not caused by waterborne contaminants, then place them to the side. If diseases do not have a contaminant listed, then add the appropriate contaminant.

4. Ask participants what are the primary causes of diseases. Discuss how biological contaminants from faeces cause the greatest disease burden, especially since they are immediate and acute. discuss that chemical contaminants are also important for public health, but that they are second priority, especially since they are often more chronic and result from the long-term consumption of contaminants, like arsenic and fluoride.

Water quality

1. Use **Slide No. 5** to group contaminants into microbiological, chemical and physical categories.

   Explain that this may be a be review for some of the participants, but it is important for everyone to have a basic understanding because different household water (HWT) options remove different types of contaminants. Understanding the contaminants will influence the participant's selection of appropriate HWT options.

   Also mention that the focus of the workshop will be on the removal of biological pathogens since it is the largest public health issue; however, some HWT options can also remove chemicals and improve physical qualities of drinking-water, so they will review them in brief.

2. Use **Slide No. 6** to explain the difference between microbiology and epidemiology.

3. Show **Slides Nos. 7–12** to introduce the four types of pathogens that cause illness from drinking-water:

   - viruses,
   - bacteria,
   - protozoa,
   - helminths.

   Explain that they are going to focus on pathogens that are waterborne (i.e. from drinking-water) since this is what they are addressing with household water treatment.

4. Use **Slide No. 13** to focus on the common waterborne diseases found in the region.

5. Discuss the epidemiology of diarrhoea in depth using **Slides Nos. 14–17**. Explain that the evidence (Fewtrell and Clasen studies) presented on **Slide No. 17** will be discussed in more depth later in the workshop.

- Symptoms of other diseases usually caused by bacteria (e.g. cholera, shigellosis and typhoid), may also be caused by virus or protozoa (e.g. *Amoeba*, *Cryptosporidium* and *Giardia*).
- Amoebic dysentery is the most common illness and affects around 500 million people each year.
- Diarrhoea occupies a leading position among infectious diseases as a cause of death and illness, killing 1.8 million and causing approximately 4 billion cases of illness annually.
- According to WHO (2004), in the Western Pacific region alone, diarrhoea causes over 100 000 deaths each year and has a disease burden of over 5 million disability-adjusted life years (DALYs). The trainer should take note that these figures may need to be updated.
- For every child who dies, countless others suffer from poor health and lost educational opportunities leading to poverty in adulthood. Every episode of diarrhoea reduces their calorie and nutrient uptake, setting back growth and development.
- The United Nations Development Programme (UNDP, 2006) estimated that parasitic infections retard the learning potential for more than 150 million children and water-related illness causes the loss of 443 million school days each year.

6. Use **Slide No. 18** to discuss common chemical contaminants.

7. Use **Slides Nos. 19–24** to review arsenic contamination in more detail since it is a known issue in South-East Asia.

- Arsenic can naturally occur in ground water and some surface water.
- Testing is the only way to tell if arsenic is present.
- Levels can vary significantly from one well to another, even if close by.
- WHO considers arsenic to be a high priority for screening in drinking-water sources.
- Several different HWT technologies have been developed to remove arsenic from water. Each technology has advantages and limitations. Many of these technologies are being used in Bangladesh, where the arsenic problem is widespread.

8. Use **Slide No. 25** to discuss the physical characteristics of drinking-water.

- Explain that physical qualities are not contaminants and do not cause health issues, but they may be an indicator of chemical or microbiological contamination.
- Physical qualities are usually things that we can measure with our senses—turbidity, colour, taste, smell and temperature.
- In general, drinking-water is judged to have good physical qualities if it is clear, tastes good, has no smell and is cool.

9. Use **Slides Nos. 26–27** to discuss the differences between safe and improved water.

- Safe water does not have any detectable faecal contamination in any 100 ml sample and meets the WHO *Guidelines for drinking-water quality* (2006).
- Improved water is defined by WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (2010) as a drinking-water source that by nature of its construction adequately protects the source from outside contamination, in particular faecal matter.
- Assumed that certain sources are safer than others, but not all improved sources provide drinking-water that is safe. Contamination can occur at the source or within a piped system. Even unhygienic handling of water during transport or within the home can contaminate previously safe water.

Multi-barrier approach and household water treatment

1. ***Option depending on time***—Divide participants into partners or small groups. Ask them to discuss their own experience in terms of the drinking-water quality they receive and how they treat their water, as well as what people can do in their home to ensure safe drinking-water.

2. In a large group, ask participants to identify possible interventions for safe water and record them on a flip chart in the following groups without telling the participants how you are grouping them: source protection, sedimentation, filtration, disinfection, and safe storage. Use different colour markers for each group to help distinguish them

3. Ask the participants to guess the names of groups. Write in the headings to show the five steps of the multi-barrier approach: source protection, sedimentation, filtration, disinfection, and safe storage. Fill in any blanks that the participants have not identified.

4. Use **Slides Nos. 28–29** to explain the multi-barrier approach to reduce the risk of drinking unsafe water.

   - Each step in the process, from source protection to water treatment and safe storage, provides an incremental health-risk reduction.
   - The water treatment process is primarily focused on removing pathogens from drinking-water—the biggest and most immediate public health issue. While improving the micro-biological quality, there are some technologies that may also be able to remove certain chemicals as a secondary benefit, such as arsenic and iron.
   - More often than not, people focus on a particular technology that is directed towards one step rather than considering the water treatment process as a whole. While individual technologies can incrementally improve drinking-water quality, the entire process is essential in providing the best water quality possible.
   - Safe storage and proper handling are often neglected. They are critical to prevent recontamination of safe water.

5. Use **Slide No. 30** to define household water treatment and safe storage.

   - ***Optional depending on time and participants***—Ask what they already know about household water treatment. Discuss responses and whether they fit with the definition on **Slide No. 30.**
   - Although HWTS is not new, its recognition as a key strategy for improving public health is just emerging. For centuries, households have used a variety of methods for improving the quality of their drinking-water.
   - HWTS follows the same process as community water treatment: sedimentation, filtration and disinfection. The main difference is that HWTS uses technologies that can be applied within the home.

Review

1. Review the learning expectations on **Slide No. 2** and the flip chart from the introduction. Ask participants to discuss with a partner whether or not the expectations have been met.
2. Ask if there are any final questions

LESSON PLAN
Introduction to HWTS 3

LEARNING EXPECTATIONS

By the end of this session, participants will be able to discuss the research and evidence on HWTS in terms of:

1. **HWTS and the Millennium Development Goals (MDGs).**
2. **Preventing diarrhoeal disease.**
3. **Economic benefits.**
4. **Realizing the potential of HWTS.**

1 HOUR 30 MINUTES

MATERIALS

✓ Computer and projector
✓ Flip chart paper
✓ Tape
✓ PowerPoint: *Introduction to HWTS*
✓ Markers

PREPARATION

✓ Review Module 1 in the *Participant Manual.*
✓ Fill in the data for **Slide No. 8**. Country-specific information on the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation can be found at: www.wssinfo.org.
✓ Hide or show country **Slides Nos. 9–12** (provided as examples in thelesson plan) as appropriate for the participants.
✓ Write "Where and when are they most applicable?" as the title on a piece of flip chart paper. On the page underneath, write "HWTS and community systems" as the heading of two columns.

INTRODUCTION

1. Show **Slide No. 1** to introduce the new topic. Use **Slide No. 2** to describe the objectives of this session.
2. Tell participants that they can refer to Module 1 in their *Participant Manual*.

HWTS and the Millennium Development Goals

1. Show **Slide No. 3** and introduce the topic: "HWTS and the MDGs".

2. Show **Slide No. 4** listing the MDGs. Ask participants which goals might be influenced by HWTS.

3. Ask participants to hold up the number of fingers to show how many goals HWTS can contribute towards. Explain that in many ways HWTS can contribute to all the MDGs.

   - **GOAL 1**—Less diarrhoea equals more time for productive activities; unsafe water is a major cause of poverty and malnutrition; poorest households pay as much as 10 times more for water as wealthy households.
   - **GOAL 2**—Less diarrhoea equals improved school attendance; water-related diseases cost 443 million school days each year and diminish learning potential.
   - **GOAL 3**—HWTS gives women control of their own water situation; time women spend caring for children made ill by waterborne diseases diminishes their opportunity to engage in productive work.
   - **GOAL 4**—Less childhood diarrhoea equals less childhood mortality; unsafe water accounts for the vast majority of the 1.8 million child deaths each year from diarrhoea, the second-largest cause of child mortality; safe water can reduce the risk of a child dying by as much as 50%.
   - **GOAL 5**—Less diarrhoea equals improved health; safe water reduces the incidence of diseases and afflictions—such as anaemia, vitamin deficiency and trachoma—that undermine maternal health and contribute to maternal mortality.
   - **GOAL 6**—Unsafe water restricts opportunities for hygiene and exposes people with HIV/AIDS to increased risks of infection; HIV-infected mothers need safe water to make formula milk; people living with HIV/AIDS need safe water to improve the absorption of their antiretroviral medication.
   - **GOAL 7**—Includes water targets, which will be discussed in a minute.
   - **GOAL 8**—HWTS is clearly part of the development agenda.

4. Use **Slide No. 5** to explain that the key contribution of HWTS is towards MDG 7, Target C that calls to "halve, by 2015, the proportion of people without sustainable access to safe drinking-water and basic sanitation."

5. Use **Slide No. 6** to explain that:

   - Reaching the MDG target requires both quantity (access) and quality (safety) of drinking-water.
   - The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation household surveys and censuses, the way by which the MDG targets are assessed, do not provide specific information on water quality.
   - Proxy indicator of "improved water source" is used to indicate water quality.

6. Use **Slide No. 7** to illustrate the percentage of those with access to improved water sources around the world in 2008.

7. Show **Slide No. 8**. Ask participants if they know the missing figures on the slide for their country. Discuss their responses and then present the WHO/UNICEF *Joint Monitoring Programme data for the country.*

8. ***Optional depending on participants***—Show **Slides Nos. 9—12** and review country-by-country figures.

9. Ask participants how they are doing in terms of achieving the MDG target for safe drinking-water: poorly, good, very good, perfect.

10. Use **Slide No. 13** to explain that they are doing well to meet the MDGs, however:

- The current trend will still leave hundreds of millions without improved water sources by 2015 (WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, 2010).
- The health benefits of safe drinking-water will likely remain out of reach for vast populations for years to come.
- 75% of these people will live in rural areas where poverty is often most severe and the cost and challenge of delivering safe water are greatest.

11. Use **Slide No. 14** to explain that even if we provide everyone with access to "improved water sources", they will not necessarily have sustainable access to "safe water".

- Discuss the data in the table and explain the varying quality of water found by the WHO *Rapid assessment of drinking-water quality,* in which 1600 samples in five countries were analysed to determine whether they met the WHO *Guidelines for drinking-water quality.*

12. Use **Slide No. 15** to explain that improved water sources are also often far from the home and therefore susceptible to contamination during collection, transport and storage.

- A review by Wright et al. (2004) showed the bacteriological quality of drinking-water significantly declined after collection in many settings.

13. Show **Slide No. 16**. Explain that due to these issues—and considering that money should not be diverted from implementing piped water supplies—there is a call by WHO and health professionals to investigate alternative ways to improve health. One of these alternate ways is HWTS.

14. Use **Slide No. 17** to explain that many now recognize that HWTS can play an important role in meeting the safety component of MDG Goal 7, Target C.

- Although HWTS was not included in the original baseline data and cannot therefore be counted towards the target, it is now tracked by the WHO/UNICEF Joint Monitoring Programme. The two main household surveys used by the Joint Monitoring Programme now include questions on household water treatment. The purpose of the questions is to know whether drinking-water is treated within the household and, if so, what type of treatment is used. The questions provide an indication of the drinking-water quality used in the household.
- Use **Slides Nos. 18 and 19** to emphasize the important role of HWTS, even though it still needs to be regarded as a temporary solution. These slides are taken from the WHO/UNICEF Joint Monitoring Programme 2012 report.

15. Show **Slide No. 20**. Divide participants into groups of four to six people. Explain that the groups should discuss when and where HWTS might be most applicable and when and where community systems might be most applicable.

16. Show **Slide No. 21**. Hand each group a piece of flip chart paper and some markers. Ask participants to divide their paper into two halves. Ask them to give one half the title "HWTS" and the other half the title "Community supply".

- Tell participants they have 10 minutes to discuss and record where and when HWTS might be the most appropriate solution and where and when community supplies might be the most appropriate solution.
- After 10 minutes ask the groups to display their papers on the wall so that everyone can see them.

17. Ask participants if they have any questions for the other groups to understand what they have discussed.

18. Ask participants if there are any surprises on the papers posted on the walls.

19. Ask participants if there are any situations where using both community supply and HWTS might be appropriate.

20. Conclude by stating that each of the options has its advantages and limitations and it is necessary to judge each situation based on the information available at the time.

Preventing diarrhoea

1. Use **Slide No. 22** to introduce the next topic: Preventing diarrhoea.

2. Use **Slide No. 23** to explain that drinking-water quality has become an important public policy focus and is less controversial than it once was. Two decades ago, Esrey and colleagues (1985, 1991) reviewed the existing literature and concluded that initiatives that improved water quality were considerably less effective than initiatives focused on water quantity, water availability and sanitation.

- Their conclusions have been cited widely in professional journals and practical guides, resulting in a prevailing belief that greater attention should be given to water supply and sanitation rather than to drinking-water quality. Equally entrenched became the belief that improving drinking-water quality would have relatively little impact on reducing diarrhoeal disease.
- Explain briefly the different reductions Esrey's reviews attributed to different intervention types.

3. Use **Slide No. 24** to explain that new evidence suggests that water quality interventions at the point of use or household may have a greater effect than previously thought.

- Explain that the graph shows a forest plot of studies reviewed by Fewtrell in 2005. The square represents the average risk reduction of having diarrhoea and the line represents the range of this reduction. Explain that the vertical line represents no risk reduction and that the further to the left of the line, the greater the reduction in diarrhoea.
- Fewtrell et al. (2005) showed that water quality interventions at the point of use or household had a greater effect than those at the source. They concluded that diarrhoeal episodes are

reduced by 25% through improving water supply and by 35% via household water treatment and safe storage; this increases to 39% when the poor-quality studies are excluded. Indicate these plots in the red box.

4. Show **Slide No. 25**. Explain that there have been two further reviews of published studies that have also agreed with Fewtrell's finding that water quality interventions are more effective at the household.

- Briefly explain the reductions found for source and household water quality interventions as indicated by the red box. The authors reported a reduction in diarrhoeal disease by roughly half (44%–47%), on average, with some studies (e.g. filtration) resulting in diarrhoeal reductions of 70% or more.
- Although these figures seem impressive there is some debate in the academic world as to whether these studies may exaggerate the real effects.

5. Show **Slide No. 26**. Explain that normally when carrying out a trial of a new drug you would provide some people in your trial with the actual drug you want tested and some people with a placebo, a fake drug that would have no effect on their body. Ask participants why they might do this.

- Explain the "placebo effect" where people will often note improvements in their health when they have taken the fake drug, a drug that does not improve their health. Explain that the same may happen with HWTS. Providing one group with the fake drug allows researchers to eliminate this effect since participants do not know if they have received the real or the fake drug. This is called a blinded trial.
- There have been very few studies of HWTS using blinded trials, but the four that have been carried out have shown little effect on health. This suggests that much of the impact may be attributable to reporting bias and placebo effect. Point out, however, that this is a very limited number of studies given the wide range of HWTS technologies and implementation settings. It is also very difficult to carry out blinded trials of some HWTS technologies, such as filters.
- Nonetheless, these studies do show some doubt on the true efficacy of HWTS, and there is a need for further blinded studies to understand the true health benefits that might be gained.

6. Use **Slide No. 27** to explain that there are also some questions regarding the long-term health effect of HWTS. The majority of studies of HWTS have been for less than one year, and there is evidence that their effectiveness decreases with time.

The slide shows another forest plot by Waddington (2009). Discuss the red box that shows that studies under 12 months have greater diarrhoea reductions than those over 12 months.

Ask participants to discuss in pairs why this might be the case? After three minutes, discuss responses with the entire group.

- Emphasize the essential need to ensure correct, consistent use of HWTS in order to maintain the protective effect.

Point out that there is a need for more long-term studies of HWTS to compare the sustainability of health benefits gained and to better understand the factors related to sustainability.

7. Show **Slide No. 28**. Ask partners to discuss the number of pathogens they have to remove from water to observe health improvements. After three minutes discuss responses with the entire group.

8. Use **Slide No. 29** to explain that while the WHO *Guidelines for drinking-water quality* are useful for measuring water quality in general, they are not designed to measure the performance of HWT options. In 2011, WHO also developed a set of targets for HWT microbiological performance. The targets are based on three levels of potential health gains for different levels of pathogen removal.

Slide No. 29 shows the levels of protection under those new targets.

9. Show **Slide No. 30** and explain that the standards use log reduction values as their measure. Use the slide to explain log reduction values. This can be understood as the percentage of pathogen that the HWT option will reduce.

- 1 $\log_{10}$ = 90% reduction
- 2 $\log_{10}$ = 99%
- 3 $\log_{10}$ = 99.9%
- 4 $\log_{10}$ = 99.99%, and so on

10. Use **Slide No. 31** to explain that this is the main table from the draft WHO standards. It shows the log reductions (and corresponding percentage removals) for various levels of protection against bacteria, viruses and protozoa.

11. Use **Slide No. 32** to explain that there are many laboratory studies that can help us determine which category each HWT option fits under.

Explain that participants will get the opportunity later in the workshop to discuss the effectiveness of individual technologies both in the laboratory and the field. This slide is simply to show the range of effectiveness for different technologies.

HWTS costs and cost-effectiveness

1. Show **Slide No. 33**. Introduce the next topic: HWTS costs and cost-effectiveness.

Explain to participants that while HWTS can be effective in preventing diarrhoea, the degree to which it reduces disease will not depend on effectiveness alone. It will also depend on the cost and cost-effectiveness.

2. Ask participants which household water treatment solution has higher costs, ceramic filters or chlorine. Ask participants to raise their hands if they think chlorine; then ask participants to raise their hands if they think ceramic filters.

Ask one person who said chlorine to explain to the group why they chose chlorine and what costs they considered.

Ask one person who said ceramic filters to explain to the group why they chose ceramic and what costs they considered.

3. Use **Slide No. 34** to explain that it can often be difficult to compare the costs of HWTS options since there are many different costs involved. Explain that there are hardware (products) and software (services) costs.

Hardware costs include the costs of durable and consumable products, which require purchase at varying times. Services costs are required at different times with promotion and education occurring at the beginning, and follow-up and support coming later.

Due to the different timing of this spending on different elements, it can be hard to compare costs. For example, how do you compare chlorine, which you have to purchase continually, with a biosand filter, which you buy once?

4. Use **Slide No. 35** to explain that there are a few common methods to compare costs across HWTS options. Briefly review the list.

Even though this helps in comparison, costs are still highly variable from location to location and depend greatly on the implementation model being used.

5. Use **Slide No. 36** to explain the results from a cost-effectiveness study carried out by Clasen in 2007. Note the variation in costs from one HWTS option to another and how they change relative to each other depending on the measure used.

6. Use **Slide No. 37** to explain the graph showing information from the same study and compare the average cost per person per year. Explain that the two bars on the left are for source water improvements. Note that again HWTS costs vary greatly from technology to technology but that many are less expensive than source water improvements.

The data we have been using are the base data for a cost-effectiveness analysis.

7. Use **Slide No. 38** to explain that a cost-effectiveness ratio compares the costs of an intervention with the social objective achieved by the intervention. Since we are aiming to reduce diarrhoea, our objective is health-based and we therefore use the standard measure of a disability-adjusted life year (DALY). Explain the definition of DALY.

8. Use **Slide No. 39** to explain the cost-effectiveness of various HWTS interventions in the WHO Western Pacific Region. Note the variety in cost-effectiveness among technologies.

Also note that the investment per DALY can also be compared with other health interventions resulting in the final column, a benchmark of not cost-effective, cost- effective or highly cost-effective.

9. Use **Slide No. 40** to explain that choosing the most cost-effective HWTS option is not necessarily choosing the best solution. The graph shows the costs versus the DALYs saved. While chlorine offers the best cost-effectiveness, filtration actually offers the highest number of DALYs averted and might be a better choice.

10. Use **Slide No. 41** to compare the investment required to cover the 50% of those currently without access to improved water sources in the Western Pacific Region. It also shows the health costs averted as a result and therefore the net costs of the source or HWTS option. Note that chlorine and solar water disinfection (SODIS) actually results in a net cost-saving.

11. Use **Slide No. 42** to explain that the results of Clasen's study have also been supported by others. WHO has previously stated that household disinfection is consistently the most cost-effective across regions. On purely cost-effectiveness grounds, it is the first choice where resources are scarce.

12. Use **Slide No. 43** to explain that another recent WHO-sponsored cost–benefit analysis also concluded that household chlorination was among the most beneficial of the various options for pursuing the MDG safe water targets. It also concluded that additional benefits included increased productivity and school attendance.

However, even commercial implementation approaches, which are often used for chlorine products, need public investment and need to ensure we do not shift the water burden onto the poor. A cautionary note should also be added, pointing out that the choice of the HWT option has to be based on the target contaminant. For example, chlorination is not effective against oocysts of waterborne protozoan, *Cryptosporidum*, while filtration is not effective against viral contaminants.

Realizing the potential of HWTS

1. Show **Slide No. 44**. Explain that they are going to take a brief look at the evidence as to whether HWTS is realizing its potential.

2. Use **Slide No. 45** to explain that most of the evidence to date is from short-term, research-driven "efficacy" studies. There is reason to question whether these same results can be achieved at scale in a programmatic context. Recent programme assessments highlight the challenge of translating the results from studies into actual effectiveness in the field.

3. Use **Slide No. 46** to explain that research has shown that HWTS offers the greatest potential for impact when certain conditions are satisfied. These conditions can be grouped into three general categories:

- ***Coverage***—Ensuring that the HWTS option is targeting the appropriate population.
- ***Performance***—Ensuring that the HWTS option used is safe and microbiologically effective.
- ***Adoption***—Ensuring correct, consistent, exclusive and sustained use.

While there is much research assessing HWTS performance, the evidence on the ability of HWTS to achieve coverage and long-term adoption is mixed. It suggests that both coverage and adoption are key challenges for HWTS.

4. Use **Slide No. 47** to explain that in order to make the biggest impact, HWTS also needs to focus on the most vulnerable. Those with:

- underdeveloped or impaired immune systems—children under five, the elderly, people living with HIV/AIDS;
- high exposure to contaminated water—families living in remote rural areas and urban slums or those displaced by war and famine.

Evidence suggests that HWTS is not adequately addressing these populations.

5. Use **Slide No. 48** to explain that an estimate of HWTS coverage carried out by Rosa and Clasen in 2010 suggested that even in households where HWTS was practised, children often did not benefit from the treated water. They also found rural populations less likely to boil water, indicating that the rural groups are also not adequately served by HWTS.

6. Use **Slide No. 49** to explain that evidence also shows that HWTS is practised by those who have the most wealth. This too suggests that the poor are not adequately being reached by HWTS.

7. Use **Slide No. 50** to reiterate that adoption is also one of the key challenges of HWTS. Explain that existing studies show a wide range of adoption of various HWTS options.

   A 2012 study based on epidemiological modeling shows how important adherence (consistent use) is in optimizing health benefits. Two recent programme assessments in Bolivia and Guatemala highlight some of the key challenges in this area.

8. Use **Slides No. 51** and **No. 52** to show the importance of consistent use. These slides summarize the principal results from the Brown and Clasen (2012) study. Although the model shows that HWTS can avert DALYs with high compliance (90% or more of consumed water being treated), nearly all the health benefits (DALYs) are lost if compliance is less than 80%.

9. Use **Slide No. 53** to explain the key findings from a programme assessment in Guatemala.

10. Use **Slide No. 54** to explain the key findings from a programme assessment in Bolivia.

11. Use **Slide No. 55** to explain that the good news is that studies show that there are health improvements when adoption is achieved—when people are correctly and consistently using HWTS.

    The diagram shows the results of a study by Arnold and Colford in 2007 related to the use of household chlorination. Explain that each of the bubbles represents a group. The horizontal axis shows the percentage of people with detectable levels of chlorine in their water, indicating they were actually using chlorine correctly.

    Explain that the further below the dotted line, the greater the reduction in diarrhoea observed in the groups. Note that those who have adopted the practice and are using it regularly show a greater reduction in diarrhoea (greater than 50%) than those that have not fully adopted it.

Review

1. Use **Slide No. 56** to summarize the key messages.

2. Go back to the learning expectations on **Slide No. 2** and review them with the entire group. Ask participants to discuss with a partner whether or not the expectations have been met.

LESSON PLAN
HWTS options
4

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Describe different sedimentation options, including settling and coagulation.**
2. **Describe different filtration options, including biosand filters, ceramic pot filters, ceramic candle filters and membrane filters.**
3. **Describe different disinfection options including chlorination, solar water disinfection (SODIS), boiling, pasteurization and distillation.**
4. **Describe how to protect stored water and prevent it from recontamination.**

6 HOURS

MATERIALS

✓ Computer and projector
✓ PowerPoint: *HWTS options*
✓ Locally available coagulants
✓ Locally available filters (e.g. biosand filter, ceramic pot filter, ceramic candle filter and membrane filters)
✓ Locally available disinfection products (e.g. chlorine solution, bleach, NaDCC tablets, bottles for SODIS and distillation cone)
✓ Locally available safe storage containers
✓ Chlorine test kit (*optional*)
✓ Source water
✓ Turbid water (at least 60 litres, enough for each technology to be demonstrated)
✓ Turbidity tube, 2-litre clear bottle, or turbidimeter
✓ Spoon for stirring
✓ Cloth for cleaning filter outlet
✓ Brush for cleaning ceramic filters
✓ Soap or chlorine
✓ Several large containers (preferably clear to demonstrate sedimentation)
✓ 1-litre container to measure flow rate
✓ Videos to demonstrate different technologies (*optional*)
✓ Flip chart paper
✓ Markers
✓ Tape

PREPARATION

✓ Review Module 2 in the *Participant Manual*.
✓ Meet with local implementers and entrepreneurs who are participating in the workshop. Discuss which technologies they will demonstrate and the topics that you would like addressed (e.g. cost, availability, operation and maintenance, treatment effectiveness, lifespan, replacement parts and supply chain requirements).
✓ Add country name to PowerPoint **Slide No. 8.**
✓ Add other locally available coagulants to PowerPoint **Slide No. 11**. Remove coagulants that will not be discussed.

- ✓ Find out before the workshop what household water treatment technologies are available locally and their cost.
- ✓ ***Sedimentation***—You will need a source of turbid water for demonstration. A local water source should be used wherever possible, as it will add more credibility to the demonstration. Making "fake" turbid water by adding dirt to water does not seem to work. Try local and traditional coagulants with your turbid water source before the workshop. Sometimes they do not work with some sources.
- ✓ ***Filtration***—You will need a source of low-turbidity water to use for demonstration. You can also use the water treated by the previous sedimentation technologies. If the biosand filter is being delivered to the workshop location, install the filtration sand before the workshop begins. Refer to CAWST's *Biosand Filter Manual, Version 10* (available at www.cawst.org) for detailed instructions on how to install filtration sand. Pour a bucket of water through each filter before the workshop to check that they work.
- ✓ ***Disinfection***—You will need a source of low-turbidity water to use for demonstration. You can use the water treated by the previous sedimentation and/or filtration technologies. Find out the chlorine concentrations of local chlorine products and calculate the required doses.
- ✓ Download videos from the Internet (*optional*):
  - Samaritan's Purse, How the Biosand Filter Works (English):
    www.youtube.com/watch?v=hb0xf3mRbJM&feature=related
  - RDI Ceramic Filters (English):
    www.youtube.com/watch?v=EU3rRiWsRE0&feature=related
    www.youtube.com/watch?v=puUid4LZCwM&feature=related
  - IDE Ceramic Filters in Cambodia (Khmer):
    www.youtube.com/watch?v=lPvHtjRvWFM&NR=1
  - UNICEF Ceramic Filters in Myanmar (English):
    www.youtube.com/watch?v=A_D_3_7MQHI
  - ENPHO SODIS in Nepal (Nepali):
    www.youtube.com/watch?v=5s9fZ1Fi0nM
  - SODIS in the Philippines (English):
    www.youtube.com/watch?v=FnjO-y8-Crw&feature=related
  - PUR (English):
    www.youtube.com/watch?v=aLAdCgnwebI&feature=related
  - Pasteurization and the Water Pasteurization Indicator (English):
    www.youtube.com/watch?v=rKsVcB_07iI

INTRODUCTION

1. Show **Slide No. 1** to introduce the new topic. Use **Slide No. 2** to describe the objectives of this session.

2. Tell participants that they can refer to Module 2 in their *Participant Manual*.

3. Introduce the local nongovernmental organizations and entrepreneurs who may be presenting with you.

Multi-barrier approach and water treatment

1. Quickly review the multi-barrier approach **(Slides Nos. 3–7)**.

2. Use the country poster from the introduction to lead a group discussion. Ask participants to identify different HWTS options that are currently being used in their country and where they fall under the multi-barrier approach **(Slide No. 8)**.

Sedimentation

OPTION 1, if time is limited—You or local implementers demonstrate the technologies to the large group.

1. Use PowerPoint **Slides Nos. 9–17** to introduce different sedimentation options *(optional)*. Show participants the corresponding section in Module 2 of their manual.

2. Set aside a portion of the turbid water in a clear colourless container.

3. Measure and record the turbidity of the source water with the participants gathered around so they can all see. Turbidity can be measured using a turbidimeter, turbidity tube or clear 2-litre bottle.

4. A simple test to measure the turbidity is to use a 2-litre clear plastic bottle filled with the source water. Place the bottle on top of a large printed page, such as the title page of the *Participant Manual.* If you can see the text when you look down through the top of the bottle, the water probably has a turbidity of less than 50 NTU.

5. With the participants still gathered around and preferably helping out, demonstrate how to sediment the turbid water using the different local methods. Make sure everyone is gathered around so they can see into the container, as sedimentation happens quickly. Use videos if local options are not available.

6. While demonstrating the process, discuss the equipment and materials needed and their availability and cost. Also, discuss the usage instructions, such as how long to stir, how long to leave it to settle, how to decant the treated water into a clean container, and how to dispose of the waste left behind in the first container.

7. Measure and record the turbidity of the treated water. Pour a sample of the treated water into a container identical to the one used in Step 2. Show participants the improvement between the before and after samples.

8. Ask participants to share any of their personal experiences using the different sedimentation options.

OPTION 2—Participants demonstrate the technologies to each other.

1. Use PowerPoint **Slides Nos. 9–17** to introduce different sedimentation options *(optional)*. Show participants the corresponding section in Module 2 of their manual.

2. Measure and record the turbidity of the source water with the participants gathered around so they can all see. Turbidity can be measured using a turbidimeter, turbidity tube or clear 2-litre bottle.

3. A simple test to measure the turbidity is to use a 2-litre clear plastic bottle filled with the source water. Place the bottle on top of a large printed page, such as the title page of the *Participant Manual*. If you can see the text when you look down through the top of the bottle, the water probably has a turbidity of less than 50 NTU.

4. Divide participants into small groups and assign one group per sedimentation option (e.g. alum, prickly pear cactus, PUR). Give each group the fact sheet for the option and ask them to prepare a five-minute presentation and demonstration for the large group. Allow 20 minutes for each group to prepare their presentation and demonstration.

5. Ask each group to present its option to the others and compare the results after 30 minutes.

6. Ask participants to share any of their personal experiences using the different sedimentation options.

Filtration

OPTION 1, if time is limited—You or local implementers demonstrate the technologies to the large group.

1. Use PowerPoint **Slides Nos. 18–27** to introduce different filtration options *(optional)*. Show participants the corresponding section in Module 2 of their manual.

2. Set aside a portion of the turbid water in a clear, colourless container.

3. Measure and record the turbidity of the source water with the participants gathered around so they can all see.

4. With the participants still gathered around and preferably helping out, demonstrate how to filter the turbid water using the different local filters. Use videos if local options are not available.

5. While demonstrating, discuss the cost, where it is available, where replacement parts are available, how much water to pour in, how often to use it, the flow rate, and any input water criteria (e.g. low turbidity). Discuss the effectiveness of the filter and what it can and cannot remove. As well, describe when and how to clean the filters.

6. Measure the flow rate by timing how long it takes to fill a 1-litre container. Collect some of the treated water and compare it to the source water.

7. Measure and record the turbidity of the filtered water. Pour a sample of the treated water into a container identical to the one used in Step 2. Show participants the improvement between the before and after samples.

8. Ask participants to share any of their personal experiences using the different sedimentation options.

OPTION 2—Participants demonstrate the technologies to each other. Use videos if local options are not available.

1. Use PowerPoint **Slides Nos. 18–27** to introduce different filtration options *(optional).* Show participants the corresponding section in Module 2 of their manual.

2. Set aside a portion of the turbid water in a clear colourless container.

3. Measure and record the turbidity of the source water with the participants gathered around so they can all see.

4. Divide participants into small groups, one group per filtration option (e.g. ceramic candle, ceramic pot, biosand filter, membrane filters). Ask each group to prepare a 5-minute presentation and demonstration for the large group. Allow 20 minutes for each group to prepare its presentation and demonstration.

5. Ask each group to present their filter option to the others.

6. Ask participants to share any of their personal experiences using the different filtration options.

Disinfection

1. Use PowerPoint **Slides Nos. 28–44** to introduce different disinfection options *(optional)*. Show participants the corresponding section in Module 2 of their manual.

2. Facilitate different disinfection options, the same as above.

Safe storage and handling

1. Use PowerPoint **Slides Nos. 45–46** to discuss safe storage and handling *(optional)*. Show participants the corresponding section in Module 2 of their manual. Emphasize the importance of safe storage to prevent recontamination of treated drinking-water.

2. Show examples of different locally available storage containers. Ask participants to identify the features that make them appropriate. Discuss if any modifications can be made to improve the container designs.

End-of-day review and closing

1. Return to the "Your expectations" flip chart with the group learning expectations that were identified in the morning and see if any of them were covered.

2. If not, give options for participants to find the information they were looking for or identify next steps for follow-up.

3. Pass out the first-day evaluation for the participants to complete before they leave. Explain how their feedback will be used to update and improve the training materials.

4. Leave the HWTS technologies out for the evening and give participants additional time to practise with them and ask more detailed questions.

LESSON PLAN
HWTS technology selection 5

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Discuss the HWTS technology selection process.**
2. **Identify criteria to select appropriate HWTS options.**
3. **Discuss the role of government and community in the selection of HWTS technologies.**

2 HOURS 30 MINUTES

MATERIALS

✓ Computer and projector
✓ PowerPoint: *HWTS technology selection*
✓ Flip chart paper
✓ Markers
✓ Tape

PREPARATION

✓ Review Module 2 in the *Participant Manual*.
✓ Write "Criteria influencing choice" as the heading on a piece of flip chart paper. Underneath, create five columns with the following headings: "Effectiveness", "Appropriateness", "Acceptability", "Cost" and "Implementation".

INTRODUCTION

1. Show **Slide No. 1** to introduce the new topic. Use **Slide No. 2** to describe the objectives of this session.

2. Tell participants that they can refer to Module 2 in their *Participant Manual*.

3. Show **Slide No. 3**. Ask participants how they would make a decision of what new car or motorbike to buy and who they would involve to help make the decision.

Technology selection

1. Use **Slide No. 3** to discuss how decision-making and technology selection can take place at many levels. There is no one right way to make decisions, and they are often made pragmatically based on the information and resources available. Decision-making can be an informal or formal process undertaken by the stakeholders.

2. Show **Slide No. 4**. Ask participants what they think is the best technology. Allow two minutes for discussion.

3. Use **Slide No. 5** to discuss how many people simply want to be told the "best" technology for household water treatment. Unfortunately, there is no easy formula that will answer this question since there are many factors to consider. Remind participants that household water treatment is a process and not just a single technology. The "best process" ought to be driven by a number of factors, including treatment effectiveness based on the source water quality and local contaminants, appropriateness, affordability, and acceptability for sustainable use by poor households.

4. Use **Slide No. 6** to discuss the different decision-making tools available to help identify the HWTS process that is best suited for the local context. Discuss the importance of participatory tools to encourage the involvement of different stakeholders in a group process. Participatory decision-making can empower communities to implement their own HWTS improvements.

Criteria for technology selection

1. Ask participants to think about their new car or motorbike again. Ask them what characteristics they would consider when selecting what vehicle to buy. Record responses on flip chart paper. Discuss each of the characteristics and try to link them to effectiveness, appropriateness, acceptability, cost and implementation.

2. Show **Slide No. 7** to explain the five criteria for HWTS technology selection. Discuss how these are the same characteristics that they identified when buying a new car or motorbike.

   Ask participants to think about the different HWTS options. Ask them what characteristics they would consider when selecting a HWTS option. Record responses on flip chart paper under the appropriate heading: "Effectiveness", "Appropriateness", "Acceptability"," Cost" or "Implementation".

3. Use **Slide No. 8** to introduce the "matrix tool".

   Ask partners to join each other so that there is a total of three groups; if more that 20 participants make six groups. Review the step-by-step instructions of the matrix tool with the participants and draw one on the flip chart to demonstrate how to set it up. Ask the groups to fill in the criteria column with the ones they came up with in Step 2.

   Ask each group a particular context for them to select an HWTS technology. For example: rural setting in mountainous area, people use surface water, water is turbid during the rainy season,

very low-income with low capacity to pay, rely on subsistence agriculture, difficult to access. Give them five minutes to discuss the characteristics of their context.

Give each group a set of HWT options (all options from sedimentation to one group, filtration to another group, and disinfection to a third group) and ask them to evaluate each of the options based on the criteria and their context.

After 30 minutes, ask each of the small groups to present their results to the whole group and explain how they arrived at their results. Give five minutes for each group presentation.

4. Discuss the following questions:

- How easy was it to evaluate the technologies?
- How would you consider the entire HWTS process in your evaluation?
- How would you include households and other stakeholders in technology selection?
- What is the value going through an evaluation process?

5. Leave posters on wall for participants to look at during their breaks and lunch.

Role of government in technology selection

1. Show **Slide No. 9.** Ask the entire group what government authorities are involved in HWTS and what should be the role of these authorities with respect to technology selection?

2. Use **Slides No. 10** and **No. 11** to discuss recommendations on the role of central government in technology selection, such as:

- Ensure that different HWTS options are available in the marketplace.
- Rely on existing studies that demonstrate that a variety of HWT technologies improve water quality and result in significant health benefits.
- Focus on field results instead of laboratory testing.
- Encourage pilot and demonstrations that will help show the local implementation of HWTS and how the technologies actually work in people's homes.

3. Use **Slides Nos. 12–14** to discuss technology verification. Ask if any of the government authorities have been involved in this process previously and what was their experience with it. Explain the difference between verification and certification. Discuss the role of technology verification in HWTS programmes.

Review

1. Use **Slide No. 15** to summarize the key messages with the entire group:
   - There is no "best" technology for HWTS. There are many HWTS options, and they all have advantages and limitations.
   - A technology should always be evaluated within the context of its implementation. There are many criteria to consider for the local context, including treatment effectiveness for the water source, appropriateness, acceptability, affordability and implementation requirements.
   - There is no one right way to make decisions about HWTS selection. There are systematic tools to evaluate technologies, but decisions are often made pragmatically, based on the information and resources available.
   - Government should ensure that different HWTS products are available in the marketplace. Rather than promoting only one HWTS option, government should try to develop a market for a range of products at a number of price points. This provides households and implementers with the freedom to make their own decisions and to choose the options that best suit them.
2. Go back to the learning expectations on **Slide No. 2** and review them with the entire group. Ask participants to discuss with a partner whether or not the expectations have been met.

LESSON PLAN
Implementation of HWTS 6

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Discuss the three components of implementation: creating demand, supplying products and services, monitoring and improvement.**
2. **Discuss the roles and human capacities needed for successful implementation.**
3. **Discuss need for programme financing.**
4. **Discuss the variety of approaches that are used by different implementers.**

3 HOURS

MATERIALS

✓ Computer and projector
✓ PowerPoint: *HWTS implementation*
✓ PowerPoint: *Implementer template*
✓ Flip chart paper
✓ Tape
✓ Markers

PREPARATION

✓ Review Module 3 in the *Participant Manual*.

✓ ***Two months in advance***—Contact WHO country office and local organizing committee about the logistics (e.g. invitations, transportation and accommodation) and budget to bring in local and regional implementers to support the workshop.

✓ ***Two weeks in advance***—Provide implementers with the PowerPoint presentation template to complete and submit before the workshop. Ask them to fill in the information that is highlighted in red.

✓ ***Before the workshop***—Review implementer presentations to ensure understanding and consistency. If possible, meet with the implementers beforehand to discuss the format and their role in the session. This is also an opportunity to ask questions for clarification about their implementation programme. Select three organizations that can capture three different approaches (e.g. social marketing, commercial marketing and government institutionalization) and ask them to deliver presentations. Any other implementers can participate in the group discussions.

✓ ***Option.*** If local implementers are not able to participate in the workshop, you can either use four PowerPoint case studies already prepared or use presentations that have been submitted by the implementers in advance.

✓ Write "Creating demand", "Supplying products and services", "Monitoring and improvement", "Capacity-building", and "Programme financing" as the headings on five separate pieces of flip chart paper. Post the flip chart papers on different walls around the room.

INTRODUCTION

1. Show **Slide No. 1** to introduce the new topic. Use **Slide No. 2** to describe the objectives of this session. Introduce the local implementers who may be presenting with you.

2. Tell participants that they can refer to Module 3 in their *Participant Manual*.

3. Use **Slide No. 3** to ask why some HWTS implementation is failing to reach its potential. Point out the photo of the biosand filter that is not being used to treat water, rather it is a plant holder! Ask participants why this is.

Implementation framework

1. Use **Slide No. 4** to explain that a CAWST literature review of current implementation practices, coupled with years of experience working with more than 350 implementers worldwide, has shown that HWT implementation is being successfully carried out by a wide variety of organizations, using different HWT options and a diverse range of programmes.

2. Use **Slide No. 5** to explain that there is no standard approach to HWTS implementation:

   - HWTS is carried out by a wide variety of Implementers,
   - many different HWTS options are available,
   - many different implementation methods can be used,
   - a diverse range of overall objectives have been observed.

3. Use **Slide No. 6** to explain that although there is a wide variety of implementing organizations using different approaches, many of the most successful programmes have carefully considered and addressed the following components:

   - creating demand for HWTS,
   - supplying the required HWTS products and services to meet the demand,
   - monitoring and continuous improvement of programme implementation.

   The framework also integrates two support components that are essential for the successful planning and implementation of the programme elements:

   - building human capacity,
   - ensuring sustained programme financing.

4. Use **Slides Nos. 7–11** to explain each of the components using a different case study as an example.

5. Use **Slide No. 12** to emphasize that all components are essential for a successful HWTS programme and none of them should be neglected.

Implementation case studies

1. Show **Slide No. 13**. Ask two or three implementers to deliver their presentations. Allow each implementer 15 minutes for their presentation, including time for questions.

   OPTION. If local implementers are not able to participate in the workshop, you can either use case studies already prepared or use presentations that have been submitted by the implementers in advance.

2. Divide the participants into groups and assign them to meet with one of the presenters, if available. Ask any other local implementers to participate in one of the groups. Allow 15 minutes for participants and implementers to discuss the following questions:

   - What are your thoughts on the strategies that the implementers used for the different components?
   - What were the successes, challenges and lessons learnt?
   - What do implementers need to support their programmes?
   - What does this mean for the government?

Before starting the discussions, remind the participants that this is not meant to be a critique of the implementers, rather an opportunity for them to ask questions to better understand their needs, successes, challenges and lessons learnt.

3. Bring the large group together to summarize the discussions. Ask the presenters or a participant to summarize the key points that were mentioned. Record comments on flip chart paper.

Review

1. Divide participants into five groups.
2. Ask each group to go to one of the flip charts posted around the room.
3. Ask the group to discuss the topic and record what they have learnt on the flip chart.
4. After two minutes, ask the groups to rotate to the next flip chart. Ask the groups to review and discuss what the previous group recorded, and write down any additional points they learnt on the paper.
5. Repeat for each topic. Afterwards, ask the groups to return to their first flip chart and read the summary of thoughts. Ask the group to briefly present what is written on the flip chart to the entire group.
6. ***Optional***—Use **Slides Nos. 14–42** to summarize the key messages. This should be a quick review since most of these points should have been raised in the small and large group discussions.
7. Go back to the learning expectations on **Slide No. 2** and review them with the entire group. Ask participants to discuss with a partner what they have learnt and whether or not the expectations have been met.

LESSON PLAN
Assessing the impact of HWTS 7

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Discuss the differences between direct and indirect assessment of the impact of HWTS.**
2. **Explain the challenges in undertaking direct health impact studies.**
3. **Describe the three key areas of focus for indirect assessment of HWTS.**
4. **Discuss appropriate data collection methods and indicators for an HWTS impact assessment.**

3 HOURS

MATERIALS

- ✓ Computer and projector
- ✓ PowerPoint: *Assessing the impact of HWTS*
- ✓ Flip chart paper
- ✓ Markers
- ✓ Tape
- ✓ Paper

PREPARATION

- ✓ Write “Impacts of HWTS” as the title on a piece of flip chart paper.
- ✓ Write “Measuring direct health impact” as the title on a piece of flip chart paper.
- ✓ Write “Difficulties” as the title on a piece of flip chart paper.
- ✓ Write “Coverage indicators” as the title on a piece of flip chart paper.
- ✓ Write “Data collection methods” as the title on three pieces of flip chart paper.
- ✓ Write “Performance indicators” as the title on a piece of flip chart paper.
- ✓ Write “Adoption indicators” as the title on a piece of flip chart paper.
- ✓ Write the following text on a piece of flip chart paper:

  Organization X has implemented a three-year project to promote boiling, filtration and chlorination of water to households in rural communities.

  The target population is located in 25 villages in a remote area. The population does not have any access to improved water sources and, over the past years, has been subject to occasional outbreaks of water-related disease.

  Your task is to outline the design for an indirect impact assessment of the project.

- ✓ Draw sampling table on flip chart (*optional*).

INTRODUCTION

1. Ask participants to think about an event that made a significant impact on their life, for example, a birth or death of a family member or friend, a relationship, a marriage, an accident, etc.

2. Ask participants to think about the impact of that event on their lives.

3. Ask participants to discuss with a partner what concepts or ideas they think of when they use the word "impact". What other similar words might be used?

   Likely answers include:

   - *Change*
   - *Consequence*
   - *Influence*
   - *Effect*
   - *Result*
   - *Outcome*
   - *Transformation*
   - *End product*
   - *Alteration*
   - *Creation*
   - *Modification*
   - *Shift*

4. Use **Slide No. 1** to introduce the new topic: Assessing the impact of household water treatment and safe storage, and explain that they are going to be exploring the concepts explored in the previous activity, but in the context of HWTS.

5. Use **Slide No. 2** to describe the key learning expectations of this session.

6. Use **Slide No. 3** to explain that the session will be split into five key parts:

   - **PART 1 –** What impacts do we expect from HWTS?
   - **PART 2 –** The challenge of direct health impact assessments
   - **PART 3 –** Alternatives to direct health impact assessments
   - **PART 4 –** Sampling and presenting results
   - **PART 5 –** Group practical activity

What impacts do we expect from HWTS? **30 minutes**

1. Use **Slide No. 4** to present the topic for Part 1: What impacts do we expect from HWTS?

2. Ask the participants to find a partner. Show **Slide No. 5** and give partners five minutes to discuss the question: "What impacts (changes) do we expect to see as a result of HWTS?" Tell them they will have to share their ideas to the large group afterwards.

   Ask partners to contribute one idea of an impact they can expect. Record responses on the "Impacts of HWTS" flip chart paper. Possible responses include:

   - *Greater awareness of water issues*
   - *Greater awareness of HWTS options*
   - *Better safe water storage*
   - *HWTS available for purchase locally*
   - *People using HWTS options*
   - *People with better water quality*
   - *Less diarrhoea*
   - *Improved health*
   - *Lower medical bills = greater prosperity*

3. Use **Slide No. 6** to ask partners to discuss the difference between an outcome and a purpose. Ask pairs to share their understanding of the difference.

4. Use **Slide No. 7** to explain the common definition for both of these terms.

- ***Outcome***—A direct result of the project that has been implemented. For example, a project to distribute filters and provide training on filter use should lead to people using the filters and therefore having better water quality.
- ***Purpose***—The reason for which the project has been implemented. We expect that the results of the project will contribute to achieve this change, but the project alone may not be sufficient to achieve this, as other factors will also contribute. For example, a project to distribute filters is hoped to contribute to reduced diarrhoea but is not guaranteed to do so unless hygiene and sanitation practices are improved.

Explain to participants that many other names are often given to these definitions.

- ***Outcome***—Immediate/intermediate objectives, results.
- ***Purpose***—Overall/ultimate objective, goal, aim.

The names are less important than the idea that one is within clear reach of the project and the other is beyond the reach of the project alone.

5. Ask participants which of the impacts listed on the flip chart in the previous activity are outcomes of HWTS implementation. Circle these in blue as they are identified. Likely answers include:

- *Greater awareness of water issues*
- *Greater awareness of HWTS options*
- *Better safe water storage*
- *HWTS available for purchase locally*
- *People using HWTS options*
- *People with better water quality*

OPTION (if short of time). Identify the outcome impacts yourself and explain them to participants.

6. Ask the participants which of the impacts listed in the previous activity represent the purpose of HWTS implementation. Circle these in red. Likely responses include:

- *Less diarrhoea*
- *Improved health*
- *Lower medical bills = greater prosperity*

Explain that, as discussed in Module 1, the primary purpose of HWTS is improved health since it normally falls under the control of the public health sector.

OPTION (if short of time). Identify the purpose impacts yourself and explain them to participants.

7. Use **Slide No. 8** to explain that, based on the assumption that our purpose is improved health, there are two main areas of focus we might use for measuring impact:

- *Measuring **direct impacts***—Measuring whether the purpose has been achieved, those impacts indicated in the red circles.
- *Measuring **indirect impacts***—Measuring whether the outcomes have been achieved, those indicated in the blue circles.

8. Ask participants to discuss which of the two groups they would prefer to measure and why. Possible discussion points are given below:

Direct health impacts	
Advantages	***Limitations***
– Measure our purpose (or ultimate goal)	– Difficult to measure
– Allow comparison to other health interventions	– Costly and time-consuming to measure
	– Need experts to measure correctly
	– Factors other than HWTS use may affect health
Indirect health impacts	
Advantages	***Limitations***
– Within control of intervention	– Do not tell us if we achieved our purpose
– Easier to measure	– Need to define large numbers of indicators

9. Take answers from three or four partners and explain that we will return to this question later in the session.

The challenge of direct health impact assessments of HWTS

25 minutes

1. Use **Slide No. 9** to present the topic for Part 2: The challenge of direct health assessments of HWTS. Explain to participants that we will assume for now that they have decided to directly measure the health impact of their HWTS project.

2. Show **Slide No. 10**. Ask the partners to spend five minutes to discuss which methods might be used to measure the direct health impact of HWTS.

Ask partners to share their discussions and record responses on the "Measuring direct health impact" flip chart. Possible methods may include:

- collecting health clinic data,
- survey people to ask if they think they have had less diarrhoea,
- survey people about diarrhoea before and after intervention,
- a controlled trial (e.g. one group receives filter and another group does not, the results are then compared).

3. Show **Slide No. 11**. Ask the partners to spend three minutes discussing how difficult or not it would be to collect data for these methods. Ask partners to share their discussions and record responses on the "Difficulties" flip chart paper. Difficulties may include:

- lack of available data,
- lack of personnel to collect data,
- lack of definition of diarrhoea,
- people tell researchers what they think they want to hear.

4. Show **Slide No. 12**. Ask participants if they think it would be easy to measure changes in diarrhoea that are only a direct result of HWTS and not some other external factor (e.g. a national campaign to promote hand washing).

- In reality it is very hard to measure changes in diarrhoea that are only a direct result of HWTS because diarrhoea has many transmission routes, including not only water but also flies, unclean hands and excreta in the environment.

5. Use **Slide No. 13** to explain that these are the main recognized methods for assessing direct health impact as a result of interventions. Describe the different studies:

- ***ecological studies***—Collect and analyse existing data (e.g. clinic data, existing studies).
- ***Cross-sectional studies***—Collect and analyse data that give information on a situation/ populations at particular point in time.
- ***Longitudinal studies***—Collect and analyse data at several different times to explore changes in the population.
- ***Case-control studies***—Compare those who have a certain condition (e.g. who use HWTS) with those who do not.
- ***Cohort studies***—Analyse the risk factors associated with a particular condition (such as not using HWTS).
- ***Intervention studies***—Study the results of an intervention compared to a control group, including randomized control trials.

Explain that these types of studies are commonly referred to as epidemiological studies as they are related to studying how disease spreads, or in this case, how disease is prevented.

Ask participants to show with their fingers against their chest how many of these they have personally undertaken previously. Make sure you clearly demonstrate that you yourself have never undertaken such a study.

Explain even these recognized methods are complex and need to be carefully designed to ensure that they produce results that reflect the real impacts of HWTS.

6. Use **Slide No. 14** to explain the challenges when using these methods.

- Need to study a sample of households from several populations to ensure results are statistically significant. (Statistically significant means it is unlikely that the results occurred by chance. It can be calculated in many different ways and depends on the outcome you expect and the confidence you wish to have that it did not occur by chance. Generally this requires the assistance of an experienced statistician.)
- Need to take into account variables that could affect results (e.g. hygiene practices, age, vulnerability, water source, other diseases, season).
- People do not always remember how much diarrhoea they have had, especially after 48 hours.
- Definition of diarrhoea varies from person to person, even when defined as three or more loose stools in 24 hours.

7. Show **Slide No. 15**. Ask participants to discuss in pairs whether they think such studies (epidemiological studies) would be expensive; whether they think they would be cost-effective; and whether they can be justified.

Please explain the answer to these questions as shown in the next slide.

8. Use **Slide No. 16** to reinforce the key points that:

- Assessing the direct health impact of an intervention is exceedingly difficult, time-consuming and costly.

- It should not be done routinely for the assessment of the impact of HWTS.
- They should ONLY be considered if:
  – there is a specific research question which needs to be answered,
  – they are done by experienced epidemiologists.

Alternatives to measuring direct health impact

60 minutes

1. Use **Slide No. 17** to present the topic for Part 3: Alternatives to measuring direct health impact.

2. Ask participants to find a new partner. Tell participants to find out from each other about something really amazing that happened last year.

Give partners three minutes to discuss. At the end of the discussion ask participants what were the key word(s) used to find out from their partners about the amazing thing that happened. As participants use the key words below, record them on a blank flip chart paper.

- ***What?*** Someone won a million dollars.
- ***Where?*** In Singapore.
- ***How?*** They won a lottery.
- ***Who?*** My brother.

Explain that in terms of measuring the impact of HWTS we need to ask the same questions.

FOCUS OF INDIRECT ASSESSMENTS

1. Explain that studies have shown us that to optimize the impact of HWTS, we need to focus on three key issues, the same three issues we saw in Module 1. Show **Slide No. 18** and explain the key aspects, i.e. the who, what, where and how of HWTS interventions.
2. Link this back to the expected impacts in the opening activity and ask participants to point out which of the expected outcomes circled in blue relate to these.
3. Show **Slide No. 19** and explain that in indirect assessment we need to look at the outcomes focusing on the three key aspects for optimizing HWTS:
   - ***Coverage***—The extent to which HWTS is targeting vulnerable populations.
   - ***Performance***—Ensuring that the HWTS option is safe and microbiologically effective.
   - ***Adoption***—Correct, consistent, exclusive and sustained use of HWTS.

DEVELOPING INDICATORS

1. Use **Slide No. 20** to explain that they are going to talk about indicators. Ask participants what the term *indicator* means to them. Take two or three answers from the audience and ask for specific examples.
2. Use **Slide No. 21** to explain that an indicator is something easy to measure that suggests the presence of something else more difficult to measure (i.e. if your indicator is *present* it is likely that what you are interested in is also present). Give the following examples:
   - An indicator of good water quality in rivers is the presence of fish.
   - An indicator of malaria would be a high fever.
   - The smell or feel of fruit would be a good indicator of whether the fruit is ripe.

3. Show **Slide No. 22**. Ask participants what are the key characteristics of a good indicator. Take four or five answers from the audience.
4. Use **Slide No. 23** to review the four key aspects of good indicators:
   - ***Objective***—They do not rely on the opinion of the person collecting the data.
   - ***Measurable***—They can actually be measured in a consistent manner.
   - ***Practical***—The data are simple and practical enough to collect.
   - ***Validated association with outcome of interest***—The link between the indicator and the outcome of interest has been clearly shown.

DEVELOPING KEY IMPACT INDICATORS AND COLLECTION METHODS

1. Explain to participants that they will now look more in depth at each of the three key aspects for optimizing HWTS that were first presented in Module 1, the indicators they might use to measure them, and how they might collect the necessary data for those indicators. Explain to participants this will aid them in the practical exercise they will do at the end of the session.
2. Show **Slide No. 24**. Ask the partners to discuss what the term "coverage" means. Take one or two responses from the audience then advance to **Slide No. 25** to explain the definition.
3. Ask participants who of the groups that they have previously discussed might be the most vulnerable to unsafe drinking-water. Possible answers:
   - those with impaired immune systems (e.g. children under 5 years, the elderly and people living with HIV/AIDS);
   - those using highly contaminated water sources.
4. Show **Slide No. 26**. Ask the partners to discuss what indicators might be used to measure changes in HWTS coverage. Give partners seven or eight minutes to make their lists.
   - Ask each group to share one indicator they have on their list. Record responses on the "Coverage indicators" flip chart paper. Use **Slide No. 27** to highlight any indicators they had not considered.
5. Show **Slide No. 28**. Ask the partners to discuss what methods might be used to collect these data. Give partners seven or eight minutes to make their lists.
   - Ask each pair to share one method they have on its list. Record responses on the "Data collection methods" flip chart paper. Use **Slide No. 29** to highlight any collection methods they had not considered.
6. Show **Slide No. 30**. Ask the partners to discuss what the term "performance" means. Take one or two responses from the audience, then advance to **Slide No. 31** to explain the definition.
7. Ask participants why focus on microbiological water quality. Possible answer:
   - Because it has the most immediate and acute impact on the population.
8. Show **Slide No. 32**. Ask the partners to discuss what indicators can be used to measure HWTS performance. Give partners seven or eight minutes to make their lists.

   Ask each pair to share one indicator they have on their list. Record responses on the "Performance indicators" flip chart paper. Use **Slide No. 33** to highlight any indicators they had not considered.
9. Show **Slide No. 34**. Ask the partners to discuss what methods can be used to collect the data. Give partners seven or eight minutes to make their lists.

   Ask each pair to share one method they have on their list. Record responses on the "Data collection methods" flip chart paper. Use **Slide No. 35** to highlight any collection methods they had not considered.

10. Show **Slide No. 36**. Ask partners to discuss what the term "adoption" means. Take one or two responses from the audience, then advance to **Slide No. 37** to explain the definition. Explain to participants that adoption has three key components:
    - ***Access***—Availability of all the equipment required to carry out the HWTS. (This may be durable products, consumable products, or services.)
    - ***Affordability***—Having the necessary resources to continue investing in the practice.
    - ***Correct, consistent, exclusive and sustained use.***
11. Show **Slide No. 38**. Ask partners to discuss what indicators can be used to measure HWTS adoption. Explain that they should include indicators for access, affordability and adoption. Give partners seven or eight minutes to make their lists.

    Ask each pair to share one method they have on their list. Record responses on the "Adoption indicators" flip chart paper. Use **Slides Nos. 39** and **40** to highlight any indicators they had not considered.
12. Show **Slide No. 41**. Ask partners to discuss what methods can be used to collect these data. Give participants seven or eight minutes to discuss their lists.

    Ask each pair to share one method they have on its list. Record responses on a new "Data collection methods" flip chart paper. Use **Slide No. 42** to highlight any methods they had not considered.
13. Use **Slides Nos. 43** and **44** to finish the section. Explain that WHO and UNICEF have published a toolkit with harmonized global indicators that can be used to assess coverage, performance and adoption across regions and countries. Explain to participants that we will use the lists they have created shortly to help them to plan an impact assessment.

Quick review

14. Ask participants to write down individually the three key aspects to consider to ensure maximum impact of HWTS.
    - Coverage, performance and adoption (correct, consistent and sustainable use).

    Ask participants to share their answer with their partner. Ask one of the pairs to share its answer with the group.
15. Ask participants to write down individually the four key characteristics of a good indicator.
    - Objective, measurable, practical and validated association with outcome of interest.

    Ask participants to share their answer with their partner. Ask one of the pairs to share its answer with the group.
16. Ask the partners to discuss whether they would prefer to measure direct health impact or indirect health impact and why. Take a few responses from the partners.

Optional—Sampling and presenting results

40 minutes

1. Use **Slide No. 45** to introduce Part 4: Sampling and presenting results.

2. Show participants a bowl of candy containing 100 candies (20 of five different colours). Tip the candy onto a table.

3. Ask participants how long they think it would take to count all the candy in the bowl and determine how many there were of each colour.

4. Ask participants if there are faster ways to figure out the number of each colour.

   If participants suggest taking a smaller sample and multiplying it, ask what the advantages and limitations of taking a sample might be.

   If participants do not suggest this, then ask them if they think it would be a good idea. What would be the advantages and limitations?

5. Ask participants what would be the advantages and limitations for an impact assessment.

   - ***Advantages***—Faster, costs less, easier.
   - ***Limitations***—Needs to be carefully done to be representative.

6. Use **Slide No. 46** to reaffirm the reason why we sample.

7. Use **Slide No. 47** to describe the process for determining a sample strategy.

8. Gather everyone around a table and ask for five volunteers from the participants and explain that they will each be asked to use a specific sampling method to determine how many candies of each colour are in the bowl.

9. Present a flip chart paper containing the following table and explain that you will fill in the chart as they perform the sampling.

	Colour 1	Colour 2	Colour 3	Colour 4	Colour 5
1					
2					
3					
4					
5					

10. Ask the first volunteer to close his or her eyes and select 10 candies one by one. Mix the bowl of candy each time one is taken. Record the colours of the candy on the flip chart.

11. Put all the candy in a line and ask the second volunteer to pick out every 10th candy. Record the colours of the candy on the flip chart.

12. Randomly separate candy into five groups, ask the third volunteer to pick one of the groups at random. Record the colours of the candy on the flip chart.

13. Put all the candy back together in one group and ask the fourth volunteer to pick the 10 candies closest to him or her. Record the colours of the candies on the flip chart.

14. Return the candy to the pile and finally ask the fifth volunteer to select 10 candies that he or she thinks are most representative. Record the colours of the candies on the flip chart.

15. Explain to the participants that the bowl contained 20 candies of each of the five colours.

16. Divide participants into five groups and assign one of the methods to each of the groups. Do not tell them the official name of the sampling method.

- **GROUP 1—**Candies chosen at random with eyes closed (simple random sampling).
- **GROUP 2—**Every 10th candy selected (systematic sampling).
- **GROUP 3—**Selection of random group of candies (cluster sampling).
- **GROUP 4—**Closest candies selected (convenience sampling).
- **GROUP 5—**Candies selected based on what the selector thought was representative (purposive sampling).

17. Show **Slide No. 48** and ask groups to discuss the questions it contains with respect to the method they have been assigned.

- *Did you think the method gave a representative sample?*
- *How might you carry out this method in a project with 100 beneficiary households in one location?*

1. Simple random	Pick names out of a hat or assign numbers to beneficiaries and randomly select numbers.
2. Systematic	Every 10th participant on your beneficiary list or stand in the centre of the village, spin a bottle to determine direction, knock on every third house.
3. Cluster	Select a street in the community or select a group of houses close together in the community or those using a particular water supply.
4. Convenience	Select the most accessible houses or select the houses where you know people will be present.
5. Purposive	Select the houses you think represent the community as a whole.

Note: Participants may come up with many more ideas than those presented here.

- *How might you carry out this method in a district containing several villages and more than 1000 people who have benefitted from HWTS?*

1. Simple random	Pick names out of a hat, assign numbers to beneficiaries and randomly select numbers.
2. Systematic	Pick every 10th beneficiary on your list or pick every third location you have worked.
3. Cluster	Select a village or ethnic group or age group or socioeconomic status. You can also select multiple clusters from multiple populations groups. X poor villages, X middle-income villages and X high-income villages.

4. Convenience	Select the most accessible communities/villages in your target area or select communities/villages where you continue to work.
5. Purposive	Select the communities/villages you think represent the community as a whole.

*Note–P*articipants may come up with many more ideas than those presented here.

- *Are there any situations where this method would be particularly useful?*

1. Simple random	Good for when you wish to have a truly random sample and there are very few constraints. Generally easier with smaller populations in limited geographical areas.
2. Systematic	Good for when you wish to have a high level of random sampling and there are very few constraints. Again, this is generally easier with smaller populations in limited geographical areas.
3. Cluster	Good for large projects. As you can achieve a high level of representativeness but limit the resources you are spending.
4. Convenience	Useful where resources are severely limited.
5. Purposive	Useful where resources are very limited but you wish to get a sample as representative as possible.

Note–Participants may come up with many more ideas than those presented here.

- *What do you think the method might be called?*
  - ***GROUP 1***—Candies chosen at random with eyes closed (simple random sampling).
  - ***GROUP 2***—Every 10th candy selected (systematic sampling).
  - ***GROUP 3***—Selection of random group of candies (cluster sampling).
  - ***GROUP 4***—Closest candies selected (convenience sampling).
  - ***GROUP 5***—Candies selected based on what the selector thought was representative (purposive sampling).

If you are unfamiliar with these sampling methods and how they might practically be implemented, then read this section in Module 4 before facilitating the session.

18. Ask groups to summarize their discussion for the large group. As groups present their method, give them the correct name for each method and refer them to the section on sampling in Module 4.

19. Ask participants how they might determine the sample size required in an impact assessment.

20. Use **Slide No. 49** to explain that sample size:

- Needs to be large enough to detect a change in a way that tells us it is statistically significant (e.g. that we can say we have 95% confidence that the change we have measured actually exists). This size depends on:
  – the change that is expected within a population,
  – the expected variation of that change in the population.

It is therefore usual to consult with an expert, such as a statistician, where possible, or calculate sample size using formulae or published tables.

21. Use **Slide No. 50** to explain that for certain aspects of sampling, such as water quality testing, standard guidelines can be followed.

PRESENTING RESULTS

1. Explain that it is also important to consider to whom—and how—they will communicate the results of their impact assessment. Explain there are multiple different levels of communication they need to consider: local, district/state, national, global and academic.

2. Use **Slide No. 51** to explain that in their groups they will fill out the following table to help them explore to whom and what information needs to be communicated.

Stakeholder	Information to be communicated	Method of communication

Explain to groups they will have 10 minutes to complete the table for five key stakeholders of their choice.

Once groups have finished, get them to post their sheets on the wall and take three minutes to look at the methods that were suggested by the other groups.

Take five minutes to allow groups to comment on anything that surprises them or anything that they had not considered in their group but that is of great importance.

Quick review

1. Ask participants to find a partner and decide who is person A and who is person B.
2. Ask A to explain to B why it is necessary to take a sample.
3. Ask B to tell A what the three key steps are in determining a sampling strategy.
   - Determine study population, determine sample size, determine sampling method.
4. Ask A to explain to B how they can determine a sample size.
   - Consult an expert (a statistician) or use published tables.
5. Ask B to explain to A why it is important to plan how and to whom you will communicate your results.

Group practical activity

60 minutes

1. Use **Slide No. 52** to present the topic for Part 5: Group practical activity.
2. Divide participants into small groups of four to six people.
3. Present a flip chart paper that contains the following text and allow participants to read it.

   - Organization X has implemented a three-year project to promote boiling, filtration and chlorination of water to households in rural communities.
   - The target population is located in 25 villages in a remote area. The population does not have any access to improved water sources and over the past years has been subject to occasional outbreaks of water-related disease.
   - Your task is to outline the design for an indirect impact assessment of the project.

   While they are reading the assignment, pass out flip chart paper and markers to each group.

4. Ask the participants if they have any questions about the situation that has been presented. If needed, provide additional details using your knowledge of the region.

5. Show **Slide No. 53** and ask participants to draw the table on their flip chart.

6. Show **Slide No. 54**. Ask groups to fill in the first column header with “Key factors to assess”.

Key factors to assess			

   Explain that they will have 10 minutes to discuss the key factors that should be assessed and fill in the first column.

   Before they start, ask participants what are the three key areas of focus for indirect assessment. Use **Slide No. 55** to reiterate that the key factors to assess should relate to the key aspects for optimizing HWTS. Leave **Slide No. 55** visible during the activity.

   - Coverage, performance and adoption (correct, consistent and sustainable use).

   Circulate during the 10 minutes and help any groups that are struggling.

7. Show **Slide No. 56** to explain that the next step in the design of the assessment is to determine what indicators they will use. Ask groups to fill in the second column header with “Measurable indicators”.

Key factors to assess	Measurable indicators		

Explain that they will have 10 minutes to discuss the indicators they should use to measure each key factor and fill in the second column.

Before they start, ask participants what are the four key characteristics of a good indicator. Show **Slide No. 57** and reiterate the characteristics of a good indicator. Leave **Slide No. 57** visible during the activity.

Circulate during the 10 minutes and help any groups that are struggling.

8. Show **Slide No. 58** to explain that the next step is to determine the data collection methods to be used. Ask groups to fill in the third column header with "Data collection methods".

Key factors to assess	Measurable indicators	Data collection methods	

Explain that they will have 10 minutes to discuss what measurement methods they should use to collect data for the indicators.

Before they start, ask participants what are some of the methods they have seen for collecting data? Use **Slide No. 59** to reiterate the methods previously discussed. Leave **Slide No. 59** visible during the activity.

Circulate during the 10 minutes and help any groups that are struggling.

9. Show **Slide No. 60** to explain that the next step is to determine what comparison they would use to evaluate the data collected.

Key factors to assess	Measurable indicators	Data collection methods	Comparison

Explain that they will have 10 minutes to discuss what comparison they should use to evaluate the data.

Before they start, ask participants what are some of the methods we have seen for comparing data. Use **Slide No. 61** to reiterate the comparison methods already discussed. Leave **Slide No. 61** visible during the activity.

Circulate during the 10 minutes and help any groups that are struggling.

Option 1—Presentation of plans — 30 minutes

1. Pair up the groups.

2. Explain that each group will have to present its plan to its partner group. After the presentations, the groups should discuss the questions on **Slide No. 62**.
   - What is the strongest part of the study design?
   - What is the weakest part of the study design?
   - Is there anything missing from the study design?

3. Give the first groups 10 minutes to present their design, then allow the second groups to present their design for a further 10 minutes.

4. Return to one large group and take a few answers to each of the questions on **Slide No. 62**.

Option 2—Presentation of plans — 15 minutes

1. Once groups have completed the activity, ask them to stick their plans on the walls around the room. Ask each group to stand by its plan.

2. Ask groups to move clockwise around the room and stand by the plan of another group.

3. Explain that each group will have 10 minutes to review the plan they have in front of them. During the review, the group should answer the questions on **Slide No. 62**.
   - What is the strongest part of the study design?
   - What is the weakest part of the study design?
   - Is there anything missing from the study design?

4. Return to one large group and take a few answers to each of the questions on **Slide No. 62**.

Review — 5 minutes

Ask partners to share two things that they learnt during Module 4. Share some responses with the large group.

LESSON PLAN
Role of government in HWTS 8

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Evaluate the need for and potential contribution of HWTS to government health and development priorities.**
2. **Identify the possible roles for government to support HWTS.**
3. **Identify the key elements of a national strategy or action plan for HWTS.**
4. **Develop an action plan detailing the next steps required for government officials at all levels to begin developing and implementing a national HWTS strategy.**

4 HOURS 15 MINUTES

MATERIALS

- ✓ Computer and projector
- ✓ PowerPoint: *Role of government in HWTS*
- ✓ Flip chart paper
- ✓ Paper
- ✓ Markers
- ✓ Straws (20)
- ✓ Tape
- ✓ Pens
- ✓ Paper plates (5)

PREPARATION

- ✓ Research to see if there is an existing national strategy or action plan for HWTS for the country. If so, print and bring copies to the workshop.
- ✓ Insert country name on **Slides Nos. 3–5.**
- ✓ Write "Priority of HWTS" as the title on a piece of flip chart paper.
- ✓ Write "Possible government roles" as the title on a piece of flip chart paper.
- ✓ Write "Useful information and sources" as the title on a piece of flip chart paper.
- ✓ Write "Components of a national strategy or action plan" as the title on a piece of flip chart paper.
- ✓ Write "Taking action" as the title on a piece of flip chart paper.

INTRODUCTION

1. Divide participants into groups of five people and give each group a paper plate and three straws.

2. Explain to participants that they will have three minutes to support the plate at least 10 cm above the table using only the straws. They are not permitted to cut the straws or put holes in the plate.

3. After three minutes ask the groups how many of them have managed to support the plate.
   - None of the groups will have completed the task.

4. Give each of the groups 20 cm of tape and ask them to complete the same activity this time using the tape.
   - All the groups should complete the activity this time.

5. Ask the participants what the different elements of the activity might represent in relation to HWTS and the government.

   - Plate = successful HWTS implementation and people getting safe water.
   - Straws = HWTS implementers (e.g. nongovernmental organizations, private sector).
   - Masking tape = government.

   Note that as in the activity, government plays a vital role in supporting HWTS implementation.

6. Use **Slide No. 1** to introduce the new topic: Role of government in HWTS.

7. Use **Slide No. 2** to describe the learning expectations of this session.

8. Use **Slide No. 3** to explain the session will be split into four key parts:
   - **PART 1–** What role should HWTS have in the country?
   - **PART 2–**What role could government have in HWTS implementation?
   - **PART 3–**Developing a national strategy
   - **PART 4–**Action planning

What role should HWTS have in [*insert* Country]?

60 minutes

1. Use **Slide No. 4** to present the topic for Part 1: What role should HWTS have in [*insert* Country]?

2. Divide participants into groups of three to five people. Ask each group to elect a member who will take notes and report back to the group after the following activity.

3. Show **Slide No. 5** and explain the four questions:
   a. *How much does poor quality water contribute to the overall level of disease in [*insert *Country]?*
   b. *Is this preventable?*
   c. *How effective are current water, sanitation and hygiene solutions in reaching the most vulnerable?*
   d. *Should HWTS complement these actions? If so how?*

   Explain to participants that they will have 10 minutes to discuss responses to all four questions. Explain also that they can use their manuals to look for information to help them answer the questions.

   After 10 minutes, ask each small group to summarize its discussion and report it to the large group.

4. Show **Slide No. 6** and give the small groups five minutes to discuss the question: "How much priority should be given to HWTS given other competing needs? And why?"

   Ask groups to select a new member to take notes and report back.

   After five minutes, ask each small group to summarize its discussion and report it to the large group. Record main points on the "Priority of HWTS" flip chart.

5. Ask participants whether everyone is in agreement with regards to the priority that should be given to HWTS in their country. It is anticipated that not everyone will be 100% in agreement. Ask for ideas as to why there is a difference in opinion. Take three to four answers from the participants.

   - Explain that both our experience and access to information affect our prioritization of different solutions.

6. Show **Slide No. 7** and give the small groups five minutes to discuss the question: "What information and sources might help us decide how much priority to give to HWTS?"

   Ask each group to select a new member of its group to take notes and report back.

   After five minutes, ask each small group to summarize its discussion and report it to the large group. Record responses on the "Useful information and sources" flip chart.

7. Use **Slide No. 8** to discuss any information sources that participants did not mention during the discussion.

8. Use **Slide No. 9** to explain that WHO has organized an International Network to Promote Household Water Treatment and Safe Storage, which may be useful in providing information on existing research and HWTS stakeholders around the world. They can also refer to the resources section at the end of Module 1.

Quick review

9. Ask partners to share one thing they will do in the next months to gather more information on HWTS implementation in their country.

What role could government have in HWTS implementation? — 60 minutes

1. Use **Slide No. 10 t**o present the topic for Part 2: What role government could have in HWTS implementation.

2. Ask participants to raise their hands if they are aware of any active role that is currently being taken by any level of government in their country (e.g. central, provincial or municipal) to support HWTS?

   - If hands are raised, ask those participants to share their knowledge with the rest of the group.
   - If no hands are raised, ask participants to raise their hands if they are aware of any active roles

that are being taken by governments in other countries in connection with HWTS. If hands are raised, ask those participants to share their knowledge with the rest of the group.

3. Express that it is good to hear that the government is already playing some role in HWTS. Explain that the next activity will give participants a chance to explore other possible roles government might play in connection with HWTS in their country.

4. Divide participants into groups of four to six people. Distribute several sheets of paper and a marker to each group.

5. Use **Slide No. 11** to ask groups to list possible roles that can be played by government in connection with HWTS. Explain that they should consider all levels of government (e.g. national, regional, district and local).

Give groups 15 minutes to discuss and write each idea on a separate piece of paper in large enough writing that it can be read by the entire group.

6. Ask one person at a time from the small groups to stick their sheets at the front of the room on "Possible government roles" flip chart. If another group has the same idea, they should decide which sheet best expresses the idea and stick it on top of the other.

7. Ask participants to gather around and look at the possible roles and ask for clarification if they do not understand any of the roles described on the sheets.

8. Use **Slides Nos. 12–14** to highlight any government roles they had not considered. Add anything not considered to the "Possible government roles" flip chart.

9. Explain to participants that in the next activity they will decide which are the five most important roles and what are the responsibilities of different levels of government in each role.

10. Divide participants back into the same small groups. Provide them with flip chart paper and markers.

11. Use **Slide No. 15** to explain how to create a blank table with four columns and six rows. Ask groups to divide their paper in the same way.

Note: adjust the table columns to show all government levels within the country.

12. Show **Slide No. 16**, which shows the first column filled out with five roles. Explain that they need to decide the five most important roles the government should play in connection with HWTS and write them in the spaces highlighted in yellow. Give groups 10 minutes to complete the task.

Role 1			
Role 2			
Role 3			
Role 4			
Role 5			

13. Show **Slide No. 17** and ask groups to copy the column headings.

	Central government	Provincial government	Municipal government
Role 1			
Role 2			
Role 3			
Role 4			
Role 5			

Note: Adjust the table columns to show all government levels within the country.

Ask groups to discuss specific responsibilities each level of government might have within each role and note the responsibility: lead, support or none. Give groups 10 minutes to complete this activity.

Optional. If time allows, ask groups to discuss specific ideas as to what responsibilities each level of government might have within each role.

There is no right answer for this activity. Groups may not agree on the five most important roles. It is for the participants to decide what responsibilities should be taken based on the local context.

14. Ask each group to place their flip charts on the wall. Ask the participants to walk around and read the other flip charts. Afterwards, ask them if there is anything they strongly agree or disagree with. Take two or three responses.

15. Explain that they will have time during the action planning section to determine how they can take these ideas forward as a group.

Quick review

16. Ask partners to share a role that government might play in connection with HWTS that they had not previously considered.

Developing and implementing a national strategy

60 minutes

1. Use **Slide No. 18** to present the topic for Part 3: Developing and implementing a national strategy.

2. Ask participants to find a partner. Show **Slide No. 19** and ask each pair to identify the components they would expect to see in a national strategy or action plan.

3. Ask partners in turn to share one thing they have on their lists. Record responses on the components of a national strategy or action plan on a flip chart.

4. Use **Slide No. 20** to discuss components that were not mentioned. Also explain more details of the purpose and the goal.

5. Divide the participants into four groups. Refer participants to *Participant Manual*, Appendix 1 where they will find the national action plan for the United Republic of Tanzania. Explain to the groups that they are going to take some time to review the Tanzanian national action plan.

   Optional. If one exists, use the current national strategy or action plan for the specific country of the workshop.

6. Use **Slide No. 21** to explain that each group will be given 15 minutes to read through the plan and answer one of the four questions listed on the slide.

   - **GROUP 1—**What are three key strengths of the plan?
   - **GROUP 2—**What are three key weaknesses of the plan?
   - **GROUP 3—**Is there anything missing from the plan?
   - **GROUP 4—**Is there anything you would remove from the plan?

   Ask each small group to report back on its discussion to the large group. If time permits, ask the other groups for comments.

OPTIONAL activity (if time allows)

1. Distribute flip chart paper and markers to the groups. Use **Slide No. 22** to explain that they are now going to develop their own action plan. Give 15 minutes for the groups to develop:
   - A clear, concise purpose for their country's HWTS plan:
     – health focus: reduce disease,
     – emphasize need to target vulnerable populations where gains are greatest,
     – confirm that strategy should not divert resources from improving water supplies.
   - An expression of the goal of the HWTS strategy:
     – X% coverage by those without access to improved water supplies by year.
   - Three to five guiding principles.
2. Ask each group to place its flip charts on the wall. Ask the participants to walk around and read the other flip charts. Afterwards, ask them note one point that they particularly like. Ask three to four participants to share the point they like with the larger group.

7. Ask participants to return to their original partners. Show **Slide No. 23** and ask the partners to answer the question: "How would you go about developing a national plan?" Give them five minutes to discuss.

8. Use **Slide No. 24** to explain that many countries, such as the United Republic of Tanzania, have developed their HWTS action plans by calling a stakeholder workshop at which a strategy can be developed and discussed. Explain that this approach allows the developers of the plan to:

   - share information and experience from international experts, nongovernmental organizations and local implementers;
   - engage high-level governmental participation and commitment;
   - mobilize regional, district and local levels of government;
   - ask for specific information and opinions on government role from all stakeholders present.

9. Ask participants if they think this would be a good thing to do in their country. Take three or four responses. Explain that they will have an opportunity to discuss the next steps in planning the development of a national strategy in Part 4.

10. Explain that while having a good strategy and action plan is important, it is also important that the plan is successfully implemented. Show **Slide No. 25** and ask participants, in pairs, to discuss what recommendations they would make to ensure the successful implementation of a national strategy.

11. Ask various pairs to share their discussion. Show **Slide No. 26** and explain any of the points that were not mentioned:

   - securing political support and necessary resources;
   - building awareness, capacity and commitment at lower levels of government;
   - coordinating and leading HWTS efforts; and
   - monitoring progress and making adjustments.

Quick review

12. Ask partners to quickly list four to six of the most important steps that need to be taken in developing and implementing a national strategy or action plan.

Action planning

40 minutes

1. Use **Slide No. 27** to present the topic for Part 4: Action planning.

2. Divide participants into groups of four to six people. Show **Slide No. 28** and ask each group to identify three actions that the entire group should take to begin supporting HWTS. Give 10 minutes to complete the activity.

3. Ask each group in turn to share one of the actions on its list. Repeat until all actions have been mentioned. Record responses on the "Taking action" flip chart.

4. Discuss each action and ask who in the room should have responsibility for ensuring it happens. Ask them if they are willing to take responsibility for the action and note their name next to the action for which they are responsible.

5. Tell participants that the actions and responsibilities will be distributed to everyone by the workshop organizer so everyone remains aware of the responsibilities they have committed to.

Review — 5 minutes

Ask each person to share with a partner one thing that surprised him or her during Module 5 and one action they will take as a result. Share some responses with the large group.

LESSON PLAN
Workshop closing 9

LEARNING EXPECTATIONS

By the end of this session, participants will be able to:

1. **Recognize all that was learnt through the workshop.**
2. **Complete a self-assessment for learning and reflection.**
3. **Review learning expectations to see if they were met.**
4. **Complete a final evaluation of the workshop.**
5. **Receive their certificates and deliver closing remarks.**

1 HOUR 30 MINUTES

MATERIALS

✓ Flip chart paper
✓ Markers
✓ Tape
✓ Certificates
✓ Self-assessment
✓ Final evaluations
✓ CDs

PREPARATION

✓ Print certificates, after double-checking the names and making sure each participant is accounted for.
✓ Print the final evaluation found in *Trainer Manual, A*ppendix 4 (one per participant).
✓ Create the participant CDs (one per participant).
✓ Write the following headings on separate pieces of flip chart paper and place around the room:

- Role of HWTS in providing safe water
- HWTS technology options
- HWTS implementation
- Assessing impact of HWTS
- Role of government

INTRODUCTION

1. Divide participants into five small groups. Ask the groups to position themselves around the room in front of one of the five flip charts.

2. Explain to the participants that they will have two minutes at each topic to write as much as they can think of about that topic.

3. After two minutes, ask the participants to move to the next topic. Read what was written and only add what is not already there.

4. Keep the groups rotating until they are back to where they started.

5. Ask the participants to then read what was added after what they had written. They can then move to the next few to read what was written.

6. When finished, ask participants how that felt, what they thought, were they surprised at what they remembered or forgot?

Self-assessment

15 minutes

Ask participants to re-do the self-assessment from the beginning of the workshop. Tell them that the results will be shared in the final workshop report to be e-mailed to all participants.

Learning expectations revisited

10 minutes

Review the group learning expectations from the first day and see if all of them were addressed. If not, give options for participants to find the information they were looking for or identify next steps for follow-up.

Certificates

15 minutes

1. Make your final comments on the workshop and the participants.

2. Hand out the certificates.

Closing remarks, final evaluation and group photo

35 minutes

1. Ask participants if they have any closing remarks to share.

2. Ask the workshop organizer and host to say a few words to close the workshop.

3. Ask participants to complete the final evaluation before they leave the workshop. Explain how their feedback is very important to improve future workshops. Tell participants that the evaluation will be included in the final workshop report that will be e-mailed to everyone. Collect evaluations from participants before they leave the room.

4. Take group photo. This may also be done at the start of the workshop since some officials may participate in the opening session and leave afterwards.

APPENDICES

PRE-WORKSHOP questionnaire

APPENDIX 1

The following is a short questionnaire for you to complete so that we can better prepare for the workshop. To use this document, please tab from one field to another.

Please e-mail completed questionnaires by date to:
[Enter workshop organizer contact information]

Name: .....

Organization: .....

Position: .....

Address: .....

Telephone: .....

E-mail: .....

1 ***What do you hope to achieve by participating in this workshop?***

.....

.....

2 ***Please fill out the following table using a numbered scale with 1 being low and 10 being high.***

Content	Current level of knowledge & skills	Priority for updating your knowledge & skills
Water contamination		
Water and health		
Role of household water treatment		
Household water treatment and safe storage options		
Implementation strategies		
Health impact assessment		
Behaviour change		

3 *If only three topics could be covered, what do you suggest they should be?*

4 *Which countries have you travelled to, or worked in, and for how long?*

5 *What is (was) your current (past) role in government?*

6 *Your expertise will be an important resource at the workshop. Please describe any professional or personal experiences related to water, hygiene or sanitation in which you have gained expertise or skills? If so, we would be pleased if you would be willing to share your experiences at the workshop.*

7 *Do you have any other concerns or comments about the workshop that you would like to share with us in preparation for the training?*

8 *How did you originally hear about the training workshop?*

PARTICIPANT self-assessment

APPENDIX 2

Please complete this self-assessment at the beginning and at the end of the workshop. This is not a test and your individual results will not be shared with others. It is only meant to measure your base knowledge and show how much you have learned as a result of participating in this workshop on household water treatment and safe storage (HWTS).

Please check the box that best applies to you.

			Poor	Fair	Good	Very good	Excellent
Water quality and health connection	I am able to identify common drinking-water contaminants and diseases in the country.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
	I am able to discuss the connection between water quality and health.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
	I am able to explain the difference between improved water and safe-drinking water.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
	I am able to list the five steps in the multi-barrier approach for safe drinking-water.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Making the case for HWTS	I am able to discuss the research and evidence on HWTS in terms of: • HWTS and the Millennium Development Goals (MDGs) • Preventing diarrhoeal disease • Economic benefits • Realizing the potential of HWTS.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Sedimentation	I am able to describe different sedimentation options, including settling and coagulation.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Filtration	I am able to describe different filtration options, including straining through a cloth, biosand filters, ceramic pot filters, ceramic candle filters and membrane filters.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Disinfection	I am able to describe different disinfection options, including chlorination, solar water disinfection (SODIS) and boiling.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Safe water storage	I am able to discuss the issues of stored water quality.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
	I am able to describe how to protect stored water and prevent it from recontamination.	Before After	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

			Poor	Fair	Good	Very good	Excellent
HWTS technology selection	I am able to discuss the HWTS technology selection process.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to identify criteria to select appropriate HWTS options.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to discuss the role of government and community in the selection of HWTS options.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
Implementation of HWTS	I am able to discuss the three components of implementation: creating demand, supplying products and services, monitoring and improvement.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to discuss the roles and human capacities needed for successful implementation.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to discuss the need for programme financing.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to discuss the variety of approaches that are used by different implementers.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
Assessing the impact of HWTS	I am able to discuss the differences between direct and indirect assessments of the health impact of HWTS.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to explain the challenges in undertaking direct health impact studies.	Before	☐	☐	☐	☐	
		After	☐	☐	☐	☐	☐
	I am able to describe the three key areas of focus for indirect assessment of HWTS.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to discuss appropriate data collection methods and indicators for use in a HWTS impact assessment.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
Role of government	I am able to evaluate the need for and potential contribution of HWTS to government health and development priorities.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to identify the possible roles for government to support HWTS.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to identify the key elements of a national strategy or action plan for HWTS.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐
	I am able to develop an action plan detailing the next steps required for government officials at all levels to begin developing and implementing a national HWTS strategy.	Before	☐	☐	☐	☐	☐
		After	☐	☐	☐	☐	☐

END-OF-DAY evaluation

APPENDIX 3

1 *The most important or useful points that I picked up today were:*

2 *An unanswered question that I have from today is:*

3 *The best or more useful part of today was when:*

4 *The most disappointing part of today was:*

FINAL evaluation

APPENDIX 4

1 *Did the workshop meet your expectations? (Please check the appropriate box.)*

Completely ☐ **Partially** ☐ **Not at all** ☐

Please explain—why or why not?

.....

.....

2 *What did you think of overall length of the workshop? (Please check the appropriate box.)*

Too long ☐ **Just right** ☐ **Too short** ☐

Please explain:

.....

.....

3 *How relevant was the workshop to your organization or project's needs? (Please check the appropriate box.)*

Very relevant ☐ **Somewhat relevant** ☐ **Not relevant** ☐

Please explain:

.....

.....

4 *Rate the time allocation for each of the following. (Please check only one box for each item listed below.)*

	Far too much	Too much	Just right	Too short	Far too short
a. Presentations	☐	☐	☐	☐	☐
b. Full group activities/discussions	☐	☐	☐	☐	☐
c. Small group activities	☐	☐	☐	☐	☐
d. MODULE 1: Introduction to HWTS	☐	☐	☐	☐	☐
e. MODULE 2: Water Contamination and HWTS	☐	☐	☐	☐	☐
f. MODULE 3: HWTS Implementation	☐	☐	☐	☐	☐
g. MODULE 4: Assessing Impact of HWTS	☐	☐	☐	☐	☐
h. MODULE 5: Role of Government	☐	☐	☐	☐	☐
i. Breaks and lunch	☐	☐	☐	☐	☐

5 *Which portion of the workshop was the most useful? Please explain.*

.....

.....

6 *Which portion of the workshop was the least useful? How would you improve this portion? Please explain.*

.....

.....

7 *How would you rate the following?*
(Please check only one box for each item listed below.)

	Poor	Fair	Good	Very good	Excellent
a. Presentations	☐	☐	☐	☐	☐
b. Activities/Discussion	☐	☐	☐	☐	☐
c. Course content	☐	☐	☐	☐	☐
d. *Participant Manual*	☐	☐	☐	☐	☐
e. Trainer(s)	☐	☐	☐	☐	☐
f. Facilities	☐	☐	☐	☐	☐

8 *Are there any topics on which you would like more information?*
Are there other topics that would be of interest for a workshop? Please explain.

.....

.....

9 *Other comments about the workshop or other issues in general? Please explain.*

.....

.....

Name (optional): _____ *Organization (optional):* _____

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