

SUBREGIONAL WORKSHOP ON IMPROVING SMALL-SCALE WATER SUPPLY AND SANITATION FOR BETTER HEALTH

Meeting report
15-17 March 2017
Minsk, Belarus





**World Health
Organization**

REGIONAL OFFICE FOR **Europe**

Subregional workshop on improving small-scale water supply and sanitation for better health

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ABSTRACT

This workshop was organized by the European Centre for Environment and Health of the WHO Regional Office for Europe. It was targeted at national decision-makers in the health, water, sanitation and rural development sectors from Belarus, Estonia, Latvia, Lithuania, the Republic of Moldova, the Russian Federation and Ukraine. The workshop sought to facilitate a subregional exchange of experiences relating to safe, sustainable small-scale water-supply and sanitation services in rural areas, and to promote good practices to improve the safety and sustainability of such services.

Participants reviewed regulatory requirements and institutional responsibilities for the management and public health surveillance of small water and sanitation systems, discussed relevant challenges, identified methods for improvement, presented policy tools and internationally recognized good practices, shared national experiences with these tools and practices, described the benefits and implementation of the water and sanitation safety planning approaches for small-scale systems, and discussed future actions to improve the management of small-scale systems, including possible targets under the Protocol on Water and Health.

Keywords

DRINKING WATER
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Executive summary

Background and objectives

Supported by the United Nations Economic Commission for Europe (UNECE) and the WHO Regional Office for Europe, the Protocol on Water and Health aims to protect human health and well-being through better water management and the prevention and control of water-related diseases. The Protocol offers a practical framework to help countries realize the aspirations of the 2030 Agenda for Sustainable Development incrementally, particular the call to combat waterborne diseases in Goal 3 and to provide equitable, universal access to safely managed drinking-water and sanitation services in Goal 6.

Evidence from across the entire WHO European Region has shown that small water and sanitation systems face a range of organizational, managerial and financial challenges in ensuring the universality, equity and safety of services. Improving the situation of small water-supply and sanitation services and promoting the safe and efficient management of these services are two of the key priorities in the programme of work for 2017–2019 adopted by the parties to the Protocol. In 2016, to support policy action under the Protocol to improve these small systems, the Regional Office published the guidance document *Taking policy action to improve small-scale water supply and sanitation systems: tools and good practices from the pan-European region*.

The workshop in Minsk targeted national decision-makers in the sectors of health, water, sanitation and rural development from Belarus, Estonia, Latvia, Lithuania, the Republic of Moldova, the Russian Federation and Ukraine. It aimed to facilitate the subregional exchange of experiences relating to safe, sustainable small water-supply and sanitation services in rural areas and to promote good practices to improve them. The workshop had several specific objectives:

- to review the regulatory requirements and institutional responsibilities for the management and public health surveillance of small water-supply and sanitation systems;
- to discuss specific challenges and identify methods for addressing them;
- to introduce policy tools and internationally recognized good practices and discuss country experiences in improving these small systems;
- to describe the implementation and benefits of both water and sanitation safety planning approaches for such systems; and
- to discuss future actions to strengthen the management and performance of small systems, including the setting of targets under the Protocol.

The workshop was designed to strengthen national capacities for improving the safe management of small water-supply and sanitation systems and to inspire relevant policy actions and programmes.

Workshop programme

The workshop was divided into seven thematic sessions over the course of three days.

- Session 1 outlined why small water-supply and sanitation systems are of concern. Representatives from the focus countries described how they are addressing key issues.
- Session 2 presented the water safety plan (WSP) approach for small systems. It examined a risk-assessment tool and WSP capacity-building, implementation and scale-up.

- Session 3 introduced the sanitation safety plan (SSP) approach for small systems and featured an interactive rural planning exercise and group work on implementation.
- Session 4 addressed monitoring and surveillance of drinking-water quality and sanitary conditions in small water systems, including how to conduct a national rapid assessment.
- Session 5 focused on private wells, with relevant experiences from several countries.
- Session 6 turned to the issues of sustainable financing. It featured an exercise on estimating direct support costs and discussion of how to finance them.
- Session 7 was a roundtable discussion of the steps that the seven focus countries can take to improve the safety of small water-supply and sanitation systems.

Conclusions

Overarching themes

- Small water and sanitation systems need to be examined from a public health perspective.
- Neighbouring countries provide rich opportunities to collaborate and learn from each other's experiences.

Global context

- The Sustainable Development Goals call for safely managed water and sanitation services for all.
- Principles of universality and equity support increased attention to rural areas and small systems.

Regional context

- Small systems are a priority of the Protocol on Water and Health.
- Small-system issues can and should be included in national target-setting under the Protocol.

Small systems

- Widespread challenges for small systems include poor water-quality compliance, limited surveillance capacity, inadequate staffing and training, unsustainable financing and outdated systems.
- Some noteworthy tactics to address these challenges are connecting to larger (regional) operators, establishing financial support schemes, utilizing local authorities for advice, employing social media and developing smartphone-based solutions.

WSPs

- Based on risk-based principles, WSPs provide a public health benchmark for drinking-water supplies that is readily adaptable to varied national contexts. The step-by-step nature of WSPs facilitates the safe, effective management of small supplies.
- WSP implementation needs to be promoted at the national level, e.g. by integrating WSP-related requirements in regulations and norms for small or decentralized supplies, initiating pilots, disseminating case studies, developing guidance tools for operators and private owners, and raising awareness in the national water sector.
- Country action plans or roadmaps should be developed to implement the WSP approach.

Small sanitation systems and SSPs

- Sanitation requires looking at the entire waste chain. Major issues for small sanitation systems include a lack of information on the various elements of the waste chain, diffusion of responsibility among different actors and authorities, and the existence of many exposure groups.
- The goal of sanitation safety planning is to ensure that sanitation systems are managed to meet health objectives. SSPs identify and prioritize risks throughout the waste chain to improve waste collection, treatment and disposal.
- An SSP is a platform that brings diverse stakeholders together. It empowers public health advocacy while demanding – and reinforcing – health sector leadership.

Risk-based surveillance

- Risk-based surveillance provides a cost-effective way to address public health risks and guide interventions in the enormous number of small water-supply and sanitation systems.
- Targeted advocacy activities for decision-makers, capacity-building and strengthened regulatory requirements can all be used to promote risk-based surveillance. The EU Drinking Water Directive can be used to introduce the risk-based approach for water systems.
- Monitoring parameters should be limited to a small set of core indicators plus others that are locally relevant. It is also important to monitor service levels and the performance of suppliers and authorities. Historical risk data can help determine which indicators to monitor, which sites to monitor and how often to conduct surveillance.

Private wells

- Private wells are the most unreliable type of water supply, with low compliance rates for water quality and poor sanitary conditions. They should therefore be subject to regulation and surveillance.
- A rapid assessment of private wells can be invaluable in raising political awareness of the issues and guiding programming.
- Support possibilities include social media, smartphone solutions for sanitary inspection and financial support schemes for well improvements.

Costing and financing

- All life-cycle costs – including recurrent costs such as operations, maintenance and support – need to be considered to ensure the long-term sustainability of a water-supply or sanitation system.
- Analysis of direct support costs can help define resourcing needs, depending on the political ambitions for health protection. It can also help inform decisions about the extent of surveillance activities.

Краткий отчет

Общая информация и цели

Реализуемый при поддержке Европейской экономической комиссии Организации Объединенных Наций (ЕЭК ООН) и Европейского регионального бюро ВОЗ Протокол по проблемам воды и здоровья направлен на то, чтобы обеспечить охрану здоровья и благополучия человека путем совершенствования управления водохозяйственной деятельностью и предотвращения, ограничения и сокращения распространения заболеваний, связанных с водой. Протокол служит практической основой для деятельности по оказанию странам помощи в поэтапной реализации устремлений, сформулированных в Повестке дня в области устойчивого развития на период до 2030 года, в частности, требования вести борьбу с заболеваниями, передаваемыми с водой (Цель 3), и обеспечить всеобщий доступ на справедливой основе к безопасно организованным услугам питьевого водоснабжения и санитарии (Цель 6). Фактические данные по всему Европейскому региону ВОЗ показывают, что маломасштабные системы водоснабжения и санитарии при решении задач обеспечения общедоступных и безопасных услуг на справедливой основе сталкиваются с различными трудностями организационного, административного и финансового характера. Улучшение положения дел в маломасштабных системах водоснабжения и санитарии и содействие безопасной и рациональной организации этих услуг – это два ключевых приоритета, предусмотренных в программе работы на 2017–2019 гг., принятой Сторонами Протокола. Для того, чтобы поддержать принятие мер на уровне политики в соответствии с Протоколом и улучшить с их помощью работу этих маломасштабных систем, Региональное бюро опубликовало руководящий документ, озаглавленный "Принятие мер на уровне политики для улучшения работы маломасштабных систем водоснабжения и санитарии. Инструменты политики и передовая практика в Европе". Семинар в Минске был организован для лиц, принимающих решения в своих странах – в Беларуси, Латвии, Литве, Республике Молдова, Российской Федерации, Украине и Эстонии – в секторах здравоохранения, водоснабжения, санитарии и развития сельских районов. Общая задача семинара состояла в том, чтобы дать возможность провести на субрегиональном уровне обмен опытом в сфере предоставления маломасштабными системами водоснабжения и санитарии безопасных и устойчивых услуг в сельских районах и содействовать распространению передовой практики по улучшению качества этих услуг. Семинар преследовал несколько конкретных целей:

- проанализировать нормативные требования и обязанности различных ведомств в отношении организации работы маломасштабных систем водоснабжения и санитарии и эпиднадзора за их функционированием со стороны общественного здравоохранения;
- обсудить конкретные проблемы и выявить пути и способы их решения;
- ознакомить участников с инструментами политики и признанной на международном уровне передовой практикой и обсудить накопленный странами опыт в улучшении маломасштабных систем;
- описать процесс внедрения методов планирования безопасности как водоснабжения, так и санитарии и показать выгоды от их реализации для таких систем;

- обсудить дальнейшие меры по улучшению управления маломасштабными системами и повышению качества их функционирования, включая установление целевых показателей в соответствии с Протоколом.

Семинар должен был послужить делу укрепления национального организационно-кадрового потенциала, необходимого для улучшения безопасной организации работы маломасштабных систем водоснабжения и санитарии, и стимулировать принятие соответствующих мер и программ.

Программа семинара

Семинар состоял из семи тематических заседаний, которые проходили на протяжении трех дней.

- На первом заседании было показано, почему вызывают озабоченность и заслуживают внимания маломасштабные системы водоснабжения и санитарии. Представители стран, участвующих в семинаре, рассказали, как они решают ключевые вопросы.
- На втором заседании была представлена методика ПОБВ ("План обеспечения безопасности воды") для маломасштабных систем. Были рассмотрены методическое пособие по оценке рисков и вопросы создания кадрового потенциала для разработки ПОБВ, его реализации и расширения масштабов применения этой методики.
- На третьем заседании была представлена методика ПОБС ("План обеспечения безопасности санитарии") для маломасштабных систем, было выполнено интерактивное упражнение по планированию обеспечения безопасности санитарии в сельской местности и организована работа в группах по вопросу реализации планов.
- На четвертом заседании рассматривался вопрос о мониторинге и эпиднадзоре за качеством питьевой воды и санитарного состояния маломасштабных систем, в том числе вопрос о том, как проводить экспресс-оценку в стране.
- На пятом заседании главное внимание было уделено частным колодцам и были заслушаны сообщения об опыте нескольких стран.
- На шестом заседании участники перешли к обсуждению вопросов устойчивого финансирования. Было выполнено упражнение по оценке затрат, связанных с предоставлением прямой поддержки, и обсуждались возможные методы финансирования таких затрат.
- Седьмое заседание было проведено в формате круглого стола; обсуждались шаги, которые семь участвующих стран могут предпринять для повышения безопасности маломасштабных систем водоснабжения и санитарии.

Выводы

Всеобъемлющие темы

- Проблемы маломасштабных систем водоснабжения и санитарии необходимо рассматривать с точки зрения охраны общественного здоровья.

- У соседних стран имеются богатые возможности сотрудничать и учиться друг у друга.

Глобальный контекст

- Цели в области устойчивого развития требуют обеспечить безопасно организованные услуги водоснабжения и санитарии для всех.
- Принципы всеобщего доступа и справедливости подкрепляют тезис о необходимости уделять повышенное внимание сельским районам и маломасштабным системам.

Региональный контекст

- Маломасштабные системы являются одной из приоритетных задач, на решение которых направлен Протокол по проблемам воды и здоровья.
- Решение вопросов маломасштабных систем может и должно включаться в устанавливаемые национальные целевые показатели.

Маломасштабные системы

- К числу широко распространенных проблем в маломасштабных системах относятся неудовлетворительное соблюдение нормативов по качеству воды, ограниченные возможности осуществления эпиднадзора, недостаточное кадровое обеспечение и не соответствующий требованиям профессиональный уровень работников, неустойчивое финансирование и устаревшие системы.
- Некоторые заслуживающие внимания тактические действия по решению указанных проблем включают присоединение к более крупным (регионального масштаба) операторам, создание механизмов финансовой поддержки, обращение за советом к местным органам власти, использование социальных СМИ и разработку технических решений на базе смартфона.

ПОБВ

- Как метод, основанный на принципах анализа рисков, ПОБВ служит для систем питьевого водоснабжения эталоном действий по охране общественного здоровья, который может быть легко адаптирован к разным национальным контекстам. Поэтапный характер действий, предусматриваемых в ПОБВ, облегчает обеспечение безопасности и эффективности при организации работы маломасштабных систем.
- Необходимо поддерживать и стимулировать внедрение ПОБВ на государственном уровне, например, включать требования, касающиеся ПОБВ, в нормы и правила, регулирующие работу маломасштабных или децентрализованных систем водоснабжения, инициировать опытные проекты, распространять примеры из практики, разрабатывать методические пособия для операторов и частных владельцев и повышать уровень информированности в секторе водного хозяйства страны.
- Для внедрения методики ПОБВ необходимо разрабатывать планы действий или дорожные карты для всей страны.

Маломасштабные системы санитарии и ПОБС

- Обеспечение санитарии требует принятия мер по всей цепочке водоотведения и обращения с отходами. К числу наиболее серьезных проблем маломасштабных

систем санитарии относятся отсутствие информации о различных элементах цепочки обращения с отходами и водоотведения, рассредоточение ответственности между разными действующими субъектами и органами власти и существование множества групп, подверженных вредным воздействиям.

- Цель планирования мер по обеспечению безопасности санитарии состоит в том, чтобы вся организация работы систем санитарии была направлена на достижение целей охраны здоровья населения. В ПОБС выявляются риски и устанавливается их приоритетность по всей цепочке обращения с отходами и водоотведения, чтобы можно было улучшить систему сбора, обработки и удаления отходов и сточных вод.
- ПОБС служит платформой, объединяющей интересы различных заинтересованных сторон. Он расширяет права и возможности в отстаивании интересов общественного здоровья и при этом требует – и способствует усилению – лидирующей роли сектора здравоохранения.

Надзор на основе анализа рисков

- Эпиднадзор на основе анализа рисков является разумным с точки зрения затрат и результатов способом устранения или минимизации рисков для здоровья населения и определения направленности вмешательств в бесчисленном множестве маломасштабных систем водоснабжения и санитарии.
- Целенаправленная информационно-разъяснительная работа среди лиц, принимающих решения, укрепление организационно-кадрового потенциала и усиление нормативных требований – всё это те меры, которые можно предпринять для развития и улучшения эпиднадзора на основе анализа рисков. Для внедрения в системы водоснабжения метода анализа рисков можно использовать Директиву ЕС по питьевой воде.
- Параметры мониторинга следует ограничить небольшим набором основных показателей с добавлением нескольких параметров, актуальных для местных условий. Также важно вести мониторинг уровней обслуживания и исполнения функций поставщиков и органов власти. Для того, чтобы определить, какие именно показатели должны стать предметом мониторинга, какие объекты следует охватить мониторингом и как часто нужно проводить эпиднадзор, можно использовать данные о рисках за прошлые годы.

Частные колодцы

- Частные колодцы являются самым ненадежным типом водоснабжения: для них характерны низкие уровни соблюдения нормативов по качеству воды и неудовлетворительное санитарное состояние. Поэтому они должны подлежать законодательно-нормативному регулированию и быть охвачены системой эпиднадзора.
- Неоценимым средством повышения политической осведомленности об имеющихся проблемах и определения содержания разрабатываемых программ может быть экспресс-оценка состояния частных колодцев.
- Возможности получения поддержки включают использование социальных СМИ, технические решения на базе смартфона для проведения санитарных проверок и программы финансовой поддержки благоустройства колодцев.

Калькуляция расходов и финансирование

- Для того, чтобы добиться долговременной устойчивости системы водоснабжения или санитарии, необходимо принимать во внимание все расходы, возникающие на протяжении всего жизненного цикла системы, включая текущие расходы, такие как расходы по эксплуатации, техническому обслуживанию и материальному обеспечению.
- Определить потребности в ресурсах может помочь анализ затрат, связанных с предоставлением прямой поддержки, в зависимости от политических амбиций в сфере охраны здоровья населения. Такой анализ также может помочь определить содержание решений в отношении того, каковы должны быть масштабы мероприятий по эпиднадзору.

Introduction

This workshop was organized by the European Centre for Environment and Health of the WHO Regional Office for Europe within the framework of the United Nations Development Account (UNDA) project “Strengthening Governments’ and water operators’ capacity to ensure equity of access to water and sanitation in countries with economies in transition in the Economic Commission for Europe region, with a particular focus on small-scale water supplies and sanitation in rural areas”. The workshop was hosted by the Scientific Practical Center of Hygiene of the Belarus Ministry of Health in Minsk on 15–17 March 2017, with generous financial support from the Ministry.

The three-day workshop targeted national decision-makers in the sectors of health, water, sanitation and rural development from Belarus, Estonia, Latvia, Lithuania, the Republic of Moldova, the Russian Federation and Ukraine. The 44 participants also included WHO advisers from Germany, the Netherlands, Portugal, Serbia and the United Kingdom who shared their experiences with small water-supply and sanitation systems, as well as a large contingent of students and other observers from Belarus. See Annex 1 for the full list of participants.

Opening session. Background, objectives and expected outcomes

The workshop was opened by the Siarhei Sychyk, the director of the Center of Hygiene, on behalf of the deputy minister of health, Natalia Zhukova, and by the head of the WHO country office in Belarus, Batyr Berdyklychev. They welcomed participants to the venue and to Minsk. The workshop programme indicates who chaired each thematic session and who gave the individual presentations (see Annex 2). Alexander Reshetov and Viachaslau Pliutau served as English–Russian interpreters, and Misha Hoekstra as rapporteur.

The opening session provided an overview of the workshop background and objectives, starting with the Protocol on Water and Health. Supported by the UNECE and the Regional Office, the Protocol aims to protect human health and well-being through better water management and the prevention and control of water-related diseases. The Protocol offers a practical framework to help countries realize the aspirations of the 2030 Agenda for Sustainable Development incrementally, particularly the call to combat waterborne diseases in Goal 3 and to provide equitable, universal access to safely managed drinking-water and sanitation services in Goal 6.

Evidence from across the entire WHO European Region has shown that small water and sanitation systems face a range of organizational, managerial and financial challenges in ensuring the universality, equity and safety of services. Improving the situation of small water-supply and sanitation services and promoting the safe and efficient management of these services are two of the key priorities in the Protocol programme of work for 2017–2019. In 2016, to support policy action under the Protocol to improve these small systems, the Regional Office published the guidance document *Taking policy action to improve small-scale water supply and sanitation systems: tools and good practices from the pan-European region*.

The Protocol covers the entire water cycle. Half of the Member States in the WHO European Region have ratified it, including the seven focus countries at the workshop; however, Latvia, Lithuania and the Russian Federation have not yet set national targets, and only the Republic of Moldova has set full targets for small systems.

The workshop aimed to facilitate the subregional exchange of experiences relating to the safety and sustainability of small water-supply and sanitation services in rural areas, and to promote good practices to improve these services. The workshop had several specific objectives:

- to review the regulatory requirements and institutional responsibilities concerning the management and public health surveillance of small water-supply and sanitation systems;
- to discuss specific challenges and identify methods for addressing them;
- to introduce policy tools and internationally recognized good practices and discuss country experiences in improving these small systems;
- to describe the implementation and benefits of both water and sanitation safety planning approaches for such systems; and
- to discuss future actions to strengthen the management and performance of small-scale systems, including the setting of targets under the Protocol.

The workshop was expected to encourage cooperation within the subregion, to strengthen national capacities for improving the safe management of small water-supply and sanitation systems and to inspire relevant programmes and policy actions, including the establishment of national targets under the Protocol.

Session 1. Situation of small water-supply and sanitation services

The first thematic session provided background on the state of small water-supply and sanitation services in the European Region, particularly in the seven focus countries.

Nearly 30% of the population in the Region lives in rural areas, where decentralized water and sanitation systems are often necessary for technical, hygienic and economic reasons. Less than 60% of rural households have piped water, and just 70% have improved sanitation facilities. Small water and sanitation systems are both diverse and numerous – hundreds of thousands across the European Region – posing enormous support and monitoring challenges.

While there is no agreement on what constitutes a small system, there are some typical features: they are not sufficiently addressed by national regulations; ownership is often unclear; financial resources are limited; and staff frequently lack training, an understanding of health risks and access to technical support. Common pollution risks include ageing infrastructure, inadequate sanitation protection and practices, poor management of animal waste and vulnerability to heavy rainfall. Moreover, water quality surveillance is usually minimal, with at best a single sample taken annually.

The consequences include unsafe services, infrastructure breakdowns, drinking-water shortages, lower compliance with standards – and increased health risks. Although data are limited, particularly for rural areas, a study of the Nordic countries found that more than a third of waterborne disease outbreaks were linked to single-household supplies. An analysis by Hunter et al. found that in Europe, investing in improvements had a benefit–cost ratio in preventing acute diarrhoeal illness that ranged from 2.5 : 1 to 21.3 : 1.

Across the European Region, countries are recognizing the importance of policy action to provide safe, sustainable water and sanitation services to protect public health. Insofar as the right to safe, clean drinking-water and sanitation is essential to the full enjoyment of all human rights, it is critical to ensure that people served by small systems enjoy the same level of protection as those served by large ones.

The remainder of the session was dedicated to situation reports from individual countries.

In **Belarus**, water systems are not classified by size but by whether they are centralized or not. The country is fortunate to have artesian sources for most of its water, the most common issues being the presence of insoluble mechanical particles of iron and manganese. Iron content is declining in both private and communal systems. Other issues include the presence of chlorine, nitrates and hydrogen sulphide, as well as poorly treated wastewater from agriculture and industry. Outbreaks of waterborne illnesses are not recorded; they are usually due to a lack of disinfection, poor water sanitation and a lack of timely maintenance. Dysentery has declined steeply; the incidence of hepatitis A is low, thanks to vaccination; and the prevalence of helminthic diseases has apparently fallen. Small water systems are usually institutionally owned; institutional systems are more prone to contamination, but an effort has been made to convert them to specialized systems, and non-compliance rates are declining. Many private wells are being transferred to public ownership, enabling sanitary surveillance, and a great deal of piping has been constructed. The most unreliable water source is pit wells, which are adversely affected by agricultural activity, a lack of regular purification and a lack of experts who can make these systems safe. The number of non-compliant pit wells has been halved in recent years.

In **Estonia**, most of the population has access to high-quality drinking-water from public supplies, while 14% rely on private or community-managed supplies. Studies have shown that one half of private consumers drink water that does not meet quality standards, but they cannot be forced to drink safe water. There is little awareness of the health risks, so the government has produced information booklets; they are rarely read, but mass and social media are proving more effective. Estonia also provides free consultations. Local communities issue housing permits only if a water analysis is performed, and home businesses (such as tourist rentals) are required to have safe sources. While there is not enough funding to make individual wells safe, Enterprise Estonia (managed by the Ministry of Finance) now provides up to two thirds of the funding to either drill a new well, renovate an old one or connect to a public supply. Thirteen per cent of the population relies on small sanitation systems. Most of these systems were built before 2000 and more than 20% before 1980; about a quarter of the older systems do not meet standards.

The entire water supply of **Latvia** comes from underground sources; 21% of the population receives their water from small systems ($\leq 100 \text{ m}^3/\text{day}$). A total of 63% of the population has access to sanitation services. There have been *no* registered outbreaks of infectious diseases that might be waterborne. The country has nine major pieces of water-related legislation, including strict requirements for protective zones around water-supply points and for wastewater and pollutant discharges. Other than a lower frequency of sampling – yearly vs. quarterly – small water systems are subject to the same regulations as large ones. Among consumers of small water supplies, 64% have access to water of adequate quality; non-compliance is much higher for chemical than for microbiological parameters. Issues of concern include no requirements to implement WSPs; low monitoring frequency; compliance for iron, sulphates and ammonium; delays in taking remedial action; ageing infrastructure; and a lack of on-site expertise.

In **Lithuania**, 38% of households have their own unlicensed water supplies, and a similar percentage manage their own waste. Municipalities are responsible for providing areas with more than 50 people with access to water and sanitation. In 2015, they provided 80% of these areas with water and 72% of them with sanitation; the national target is 95% for both services. Prices are much higher for public services in thinly populated areas, which discourages new customers. Regulations do not address wells adequately; one survey found that more than 80% of dug wells did not satisfy microbiological standards. While water quality in these wells has been

improving, it is still generally unsafe, with about 50% of samples failing to meet microbiological standards and 30% toxicological standards. To prevent nitrate and nitrite poisoning, public health centres test the water from dug wells used by pregnant women and infants. Only one third of these samples test as safe; the centres provides cleaning recommendations for people whose samples exceed acceptable limits.

In the **Republic of Moldova**, 35% of the population relies on small water supplies, defined as supplying less than 200 m³/day or serving fewer than 2000 people. Centralized systems are less common for sanitation than for water supply, and most of them do not treat wastewater. Last year, the country revised its Protocol targets and adopted a national programme for implementing the Protocol between 2016 and 2025. The targets included the adoption of regulations for both water-supply and sanitation systems in 2016 and the construction of 150 alternative sanitation systems by 2025. The government adopted its first regulation establishing requirements for small water supplies. Microbiological safety remains an issue, with about 20% of rural water systems being non-compliant. Last year, a national clearinghouse established under the Protocol organized a national communication campaign on water and health issues, including training for operators of small water supplies. Financing of water and sanitation efforts remains a major challenge; others include training the operators of small systems, the implementation of WSPs and equitable access in general.

Like Belarus, the **Russian Federation** doesn't distinguish water supplies by size but by whether they are centralized or not. While the 160 000 water supplies are evenly divided between centralized and decentralized supplies, the latter cover only 6% of the population, indicating that they tend to be much smaller. The quality of decentralized systems has been declining. There are a host of relevant laws and regulations addressing water-supply quality, location, equipment and monitoring, including numerous individualized chemical and microbiological parameters. In 2016, chemical non-compliance in water samples was 28%, being greatest in the Ural Federal District and due primarily to naturally occurring impurities, while microbiological non-compliance was 20%, with the biggest problems in the Central Federal District.

In **Ukraine**, access to centralized water supply is rare in most rural areas, but there are few data on decentralized supplies. Non-compliance for water samples from decentralized supplies has risen slowly in recent years, reaching 33% for chemical parameters and 18% for microbiological ones in 2015. For centralized sources, most non-compliance is due to the absence of sanitary protection zones. Also in 2015, Ukraine saw three major disease outbreaks related to water, primarily affecting children; all three stemmed from poor quality water in centralized supplies. The largest was an intestinal infection that struck 155 people; the other two were rotavirus infections that struck 35 people in all. The percentage of wastewater released into the ocean and other surface waters has been declining, falling to 27% for domestic sources and 22.5% for industrial ones.

It was noted that high compliance rates can be a reflection of infrequent sampling, which often misses risks. The question was also raised about whether centralized systems are always safer.

Session 2. Scaling up the water safety plan (WSP) approach in small systems

The second session explained why and how to implement WSPs and featured case studies from the United Kingdom and the Republic of Moldova.

WSPs support the shift in WHO guidelines from detecting problems to preventing risks. Part of the international push for safely managed services, WSPs can be used any type or size of water supply, and they have been increasingly recognized as a benchmark in public health. Traditional compliance testing cannot detect short-term fluctuations, especially when testing is infrequent, and outbreaks can occur in the absence of faecal indicators. WSPs provide an effective, proactive approach that focuses on the comprehensive assessment and management of risk.

The WSP cycle involves identifying, assessing and addressing potential health risks, implementing improvements and monitoring of the system – and repeating the entire cycle again and again. Hazard identification requires systematically examining every element of the individual supply system, from catchment to consumption, for potential contamination events. Each event is assigned a score based on likelihood and severity, and that score is used to prioritize improvements. Once improvements are made, operational monitoring requires both frequent water quality measurements and periodic assessment of the system's observable features; it should involve the community wherever possible. WSPs result in fewer contamination incidents, increased compliance and long-term health gains. Their adoption changes the role of surveillance agencies from compliance monitoring to WSP auditing, and they can guide public health surveillance and response. WSPs also require suppliers to be proactive rather than responsive. For small systems, WHO has developed an invaluable field guide, in both English and Russian, that is simple to understand and includes hands-on instructions and templates.

The session then turned to the United Kingdom and a risk-assessment tool that local authorities there use to monitoring small private water supplies; these bodies have been responsible for implementing a risk-assessment approach since 2009. The Drinking Water Inspectorate developed the tool, consisting of a series of simple questions to identify hazards from source to tap, as well as guidance for each hazard. It captures contact details for everyone who uses the water, facilitating notification if health risks arise. The severity of each risk is predetermined by the tool; the local authority assesses the likelihood of the risk, and then the tool calculates the risk level. At the end, it summarizes all the risks, concentrating on high and very high risks, and prompts the user for which actions can be undertaken to address them and who is responsible for doing so, and creates an action plan. There is room to add comments, including the authority's overall confidence in the management of the supply. The tool was later shared with the participants online. Several expressed strong interest in adapting it for their countries.

Attention then shifted to the Republic of Moldova's experience with WSP capacity-building. The development and implementation of WSPs are recommended in two national strategies, for health and for water and sanitation. A draft law included in the association agreement with the European Union (EU) would make WSPs mandatory for drinking-water supplies. The country prepared guidance in 2015 on multisectoral WSP development, covering the major steps outlined above. Since 2014, the Regional Office and the Swiss Agency for Development and Cooperation have sponsored three WSP trainings. Last year, four participating suppliers developed WSPs, but despite support from public health officials, none of the plans have been implemented, due to a lack of experience and resources. This year, a pilot project has been undertaken to foster WSP uptake; it involves the development of model plans for three different types of sites. These plans will later be disseminated to all water suppliers and public authorities in the country.

Countries adopt and scale up the WSP approach in different ways, depending on whether the process is driven by the government, water suppliers, donors, or professional or industry groups. To help, WHO has produced a document called *A road map to support country-level*

implementation of water safety plans, available online in English and Russian. It outlines eight simplified steps for stakeholders to take to facilitate national implementation.

1. Learn about WSPs and communicate benefits to the water and health sector.
2. Establish a preliminary vision with a multisectoral steering committee and perhaps a technical working group.
3. Pilot WSPs to develop practical expertise and national examples.
4. Develop a scale-up strategy to support the preliminary vision – the national WSP roadmap.
5. Establish support mechanisms, including training, with national resources in the national language to ensure relevance and a sense of national ownership.
6. Establish policy and regulatory instruments, starting with an enabling environment and ending with legal requirements, with a phased timescale for compliance.
7. Verify the effectiveness and quality of WSPs by auditing them.
8. Review WSP experiences on an ongoing basis to share the benefits of the approach, and to identify implementation gaps and resource needs that need to be addressed.

Participants then briefly reflected on the status of the legal framework and institutional capacities for WSPs in their countries – and the bottlenecks to implementation. **Belarus** has adopted guidelines on how to conduct risk analyses in line with the WSP approach, but no legal requirements. **Estonia** has no WSPs, but it does require something similar for very large suppliers, and soon for large ones too. Small suppliers want funding support to do these assessments; they would find a WSP approach simpler and more acceptable. **Latvia** is using Annex 2 of the EU Drinking Water Directive to make WSPs obligatory for large suppliers, as well as researching the best way to have medium and small suppliers implement it. In **Lithuania**, a national working group is working to implement a plan on water and health and hoping to use its targets to amend existing laws. Right now, water safety is primarily the responsibility of the health sector, with little engagement by the environmental sector. The challenge in the **Republic of Moldova** is with capacity-building for water suppliers; the focus now is on smaller operators. The legal framework is in place. The **Russian Federation** is planning to adopt a new law, but until regulations are made specifying standards and who does what, nothing will be implemented. **Serbia** is drafting a law on drinking-water that mandates WSPs, to be followed by regulations on methodology and implementation. The **United Kingdom** has done cost–benefit analysis that shows huge savings in monitoring expenditures for suppliers switching over to the WSP approach – a persuasive argument for them.

It was noted that WSP uptake can be promoted in contacts with national delegations in the European Environment and Health process. The Protocol targets can also be useful in developing a vision for WSP uptake and the establishment of pilots. In addition, the Protocol also includes an action point on helping countries to develop roadmaps for scaling up the adoption of WSPs. When asked what specific kinds of support they would find useful, participants mentioned an overview of available tools; a computer-based tool aimed at small and medium-size suppliers; a collection of case studies from different countries; help in setting up national pilot projects; and facilitation of bilateral partnerships, so that a country with WSP experience can mentor one who is figuring it out.

Session 3. The sanitation safety plan (SSP) approach

The third session provided an introduction to SSPs, featuring an interactive exercise and group work.

Sanitation is generally a low political priority, particularly in rural areas, where most households are on their own when it comes to building and operating their systems. Not surprisingly, most of these systems do not function properly, and data on them are lacking. Yet they can have significant adverse effects on the environment, on the safety of water and food and on health. Under the Protocol, signatory countries are committed to providing adequate sanitation and ensuring the safe use of wastewater and sewage sludge in agriculture. The Sustainable Development Goals have explicit targets, including universal access to adequate, equitable sanitation and an end to open defecation (Target 6.2), and halving the proportion of untreated wastewater and increasing safe reuse (Target 6.3).

The SSP is a stepwise tool to address health risks and ensure safe management of the entire sanitation chain, including wastewater treatment and reuse. It is based on the *WHO guidelines for the safe use of wastewater, excreta and greywater*. It encompasses waste generation, treatment and use, and product use and consumption.

The workshop participants engaged in a roleplaying exercise involving the fictional town of Newtown, with both septic tanks and cesspits. They identified health risks and how they were being managed, assessed risk levels and then described how to minimize them and who should take action – in essence, a simple SSP.

A multi-stakeholder planning process is critical to SSP success; it should include representatives from throughout the sanitation chain. It is also important to engage the support of a lead agency, to obtain financial and resource commitments and to promote an enabling policy environment. Initial assessment should be conducted to map out the elements of the system and then characterize the constituents of the waste stream and the health hazards they pose (biological, chemical and physical). It is crucial to describe potential exposure groups (workers, farmers, local community and consumers) and exposure routes, the factors that affect system performance and vulnerability, and relevant technical and regulatory information.

A key component of an SSP is risk assessment – identifying and prioritizing all risks, including not only normal operating risks but also system failures and accidents, seasonal and climatic events, indirect hazards (such as vermin and upstream vectors) and cumulative hazards (such as chemical accumulation in soil). The results are then used to develop and implement first, an incremental improvement plan, and second, a monitoring plan that covers regular operational monitoring and periodic verification, SSP audits and review of the SSP itself.

While both WSPs and SSPs are risk-based frameworks with many similarities, WSPs are convergent, using multiple barriers to prevent contamination of the water supply, while SSPs are divergent, using multiple barriers to prevent exposure to faecal waste along the sanitation chain. As such, WSPs focus on the water supplier, while SSPs involve many numerous exposure groups and actors. Cooperation across sectors is thus paramount for the success of SSPs.

The workshop participants rounded out the session by dividing up into four groups, each considering different aspects of the rural application of SSPs. The first group highlighted problems particularly relevant for rural sanitation – the biggest being a lack of political interest and will. Other challenges they identified included an absence of controls, a lack of irregular cleaning, unlawful connections to central sewerage systems, frequently rotating operators, a dearth of training, heavy rains, substandard siting of systems and poor public awareness.

Another group enumerated ways in which the SSP approach can improve rural sanitation: better waste collection, better cleaning of system elements (tanks, latrines, wastewater), utilization of technology, improved communication among stakeholders, greater public awareness, increased recognition that sanitation is an environmental issue, economic boosts and a decrease in the spread of infectious diseases. The third group identified stakeholders who should be involved in implementing SSPs. Besides local actors, who play a central role, they mentioned academia, the public, health agencies, the ministry of agriculture, the ministry of the environment, district and municipal services, and lawmakers.

The final group discussed how SSPs could be integrated into their own programmes. They suggested developing a variety of trainings, utilizing the media and other communication methods and leading actively on the issue. Issues to address include a clear assignment of responsibilities, the targeting of communications and the handling of local natural features.

The health sector has shown much more interest in clean water, tending to be concerned about sanitation only insofar as it affects water. In contrast to water systems, the sanitation chain involves many steps and many actors, most of them from outside the health sector. Multisectoral action is thus critical, but political will on the issue is generally lacking; sanitation is not a politically “appealing” topic. Yet the health repercussions can be substantial. That is why WHO is committed to getting sanitation higher on the political agenda – and to using SSPs as the best way to address sanitation.

Session 4. Monitoring and surveillance of small-scale services

This session dealt with monitoring and surveillance of water-supply services. It included a case study on rapid assessment of small rural water systems in Serbia and some reflections from the Russian Federation on how to improve the sensitivity of microbiological testing.

An effective public health framework for safe drinking-water has three components: health-based targets, WSPs and independent surveillance. Key surveillance functions include monitoring compliance with water quality standards, conducting sanitary inspections, identifying contamination risks and causes, informing improvements and outbreak responses, analysing trends, auditing WSPs and advising suppliers and communities. Surveillance does not free suppliers from quality control. With small systems, surveillance resources are limited but the number of supplies is very large. Even when surveillance requirements are in place, they are often not followed – and the smaller the system, the lower the priority.

Site inspections are critical, but in practice, small supplies have a single water sample tested annually at best. Such practice misses weather events and seasonal variations and provides no opportunity to inspect the supply and inform improvements – excellent reasons to adopt WSPs, with their emphasis on risk-based management and operational monitoring. When it comes to water testing, long lists of parameters are inefficient, and most of the parameters provide minimal added value. WHO emphasizes instead a few core parameters with public health significance: *E. coli*, nitrates, turbidity, colour and odour, dissolved solids and, if relevant, chlorine, fluoride and arsenic. Others should be added if locally relevant. Rapid testing can be a good option for outbreak situations, but most rapid tests do not meet national standards. Water quality monitoring should be complemented by sanitary inspections, another example of risk-based surveillance that can be performed regularly at low cost. To increase effectiveness, small system surveillance should be prioritized to focus first on priority areas, as identified through systematic reporting.

How does a country proceed if it has minimal information about small water supplies? To answer this question, the session considered the case of Serbia again. To help it set national Protocol targets, the Serbian Institute of Public Health conducted a rapid survey of the country's small rural water supplies, based on the WHO model in *Rapid assessment of drinking-water quality: a handbook for implementation*. It used cluster sampling to provide a representative picture of water supplies while keeping costs down. Ten questionnaires were prepared, each with 10 risk questions geared to a different type of water supply or network. The survey found that among the individual supplies the majority were either protected springs, most of them unfenced, or boreholes, where latrines and other pollution sources were common. Invaluable data was also collected on chemical and microbiological compliance, system age and operator training. The rapid assessment created a strong basis for deciding on programming priorities to address the biggest threats to public health, as well as strong arguments for making WSPs mandatory, developing action plans and raising public awareness.

Drawing on nearly a half century of experience in the Russian Federation, several concrete suggestions were made for improving the control of microbiological contamination in drinking-water. In recent years, unidentified etiologist account for two thirds of acute intestinal infections there – indicating the need to strengthen the identification of pathogens. Testing with a glucose medium can detect all genera of bacteria in the Enterobacteriaceae, including many that are not detected when testing for *E. coli* with a lactose medium, notably *Salmonella*. Glucose-based media should therefore be employed when possible. The Russian Federation has also developed a track membrane with a special nutrient medium that permits testing all the bacteria colonies on the membrane and give a reliable answer within 24 hours, in contrast to the prevailing membranes, which take two or three days and are unreliable due to subjective sampling. Unfortunately, the track membrane is not yet being produced on a large scale.

While surveillance usually focuses on water quality, it is also important to collect data from service providers on service level parameters such as water quantity, availability, accessibility and affordability, and to monitor the performance of water suppliers and authorities. Four of the focus countries monitor small public piped supplies for some of these parameters; monitoring is less common for small community-managed supplies and essentially non-existent for private supplies. Participants heard about two models that monitor small supplies. A Portuguese model collects data on 16 service-level and service-provider indicators, including indicators that address economic and infrastructural sustainability and the adequacy of human resources. A model used in nine Latin American countries collects data via smartphones to assign performance rankings to small suppliers; among other things, it gathers information on community sanitation and the provision of technical assistance. This system is used to assign performance rankings, which are then made public. Major issues for small-system monitoring include continuity, quality control, coverage of private supplies and, in particular, using the data for planning, regulation and corrective action – which is what makes the monitoring worth while.

The session ended with a roundtable discussion focusing on the use of risk-based surveillance for small systems in the focus countries and what might help encourage it. **Belarus** does not collect data on wells. For other sources, it inspects supplies as well as testing for water quality. Checklists similar to those shown for the United Kingdom are used to calculate risks, but the approach is not yet codified in law. Case studies showing health benefits and problems prevented might be helpful in promoting further development of a risk-based approach. In **Estonia**, most small water supplies are unregulated private systems. It is promoting risk-based surveillance; advertising would help, as well as regulations that require monitoring. **Latvia** has no risk-based surveillance at present; it would require a great deal of work to adopt it, and there are no plans to

do so. The health ministry might be interested if it appears to be financially feasible, ideally in collaboration with the environmental agencies, but the higher levels of the ministry would need to be persuaded and there is little political will at present. **Lithuania** is mapping out all possible sources of groundwater contamination throughout the country, including boreholes, old septic tanks, industrial waste, etc. The Lithuanian Centre for Health Promotion and Disease Prevention is conducting trainings and mass media campaigns for the majority of small suppliers. The **Republic of Moldova** is starting to implement WSPs. Operators and owners are responsible for monitoring, but it often falls to the public health authority. Besides water quality, they also monitor continuity of supply, leakages and pipe failures. In the **Russian Federation**, there are 90 000 private wells. Small systems are supposed to have water testing and sanitary inspections every year, but on average it is every three years. The country has experienced outbreaks in the absence of microbiological indicators. Additional monitoring will not be conducted if it is not specified by regulations, so the regulations would need to be changed. At present, a risk-based approach is used only for centralized systems, but the participants will propose implementing it in decentralized ones, too. Finally, **Ukraine** is revising its monitoring plans, including those for small systems. They are somewhat risk-based, but more emphasis on that approach is needed.

Session 5. Focus on private (individual) wells

Session 5 addressed the challenges posed by private wells. It considered again the cases of Serbia and the United Kingdom, as well as the experiences of the seven focus countries.

Turning once more to Serbia's rapid assessment of rural water supplies, participants heard more specifically about the findings for individual supplies, defined as those that serve fewer than 5 households or 20 people. Such sources are not regulated or subject to mandatory surveillance. Among the individual supplies assessed, 27% were dug wells with electric pumps, 26% boreholes with electric pumps, 14% protected springs and 12% open dug wells. Only one sixth of the individual supplies were compliant for all 12 parameters tested; 68% of them satisfied national *E. coli* standards, while 29% met all the physicochemical standards, of which the most common problems were nitrates and conductivity. Geographic differences were in line with those for small (non-individual) supplies. Sanitary inspections found that more than half of the boreholes with electric pumps were located near a latrine or sewer; were near another pollution source; had an absent or dysfunctional drainage channel. Sanitary issues were similarly common for the other types of individual supplies. Risk assessment showed that more than 40% of the supplies had high or very high risk scores, yet the owners were rarely aware of the importance of the issues identified. The results suggest the need to integrate a risk-assessment approach for individual water supplies into national regulations, conduct awareness campaigns for both supply owners and local authorities, develop tools to track improvements, increase access to licensed systems and help finance improvements.

In England and Wales, local authorities are responsible for monitoring single-dwelling water supplies. The Drinking Water Inspectorate provides them with technical support. Because large water companies are required to monitor raw water, their data has allowed the Inspectorate to develop heat maps highlighting where there are problems with the groundwater. Small private supplies provide only 1% of consumers with water, yet that still covers some 40 000 wells. It was only when the law changed and the Inspectorate gathered locally held data that it became clear just how many there were. While domestic well owners do not have to perform risk assessments, they must still hew to regulations. When property is sold, a single water sample must be taken. The inspectorate is trying to educate lawyers and realtors about the importance of risk assessment and owner responsibilities. While the quality of private supplies has improved,

thanks partly to regulatory changes, 6% of their water samples are non-compliant. Risk-based assessment and monitoring were introduced for private supplies in 2010; those that serve more than one dwelling now have to do risk assessments every five years, but there is no such requirement for single-dwelling supplies. Fifteen per cent of small supplies still contain enterococci and 15% *E. coli*. Local authorities can charge owners and users for non-compliance or a failure to address issues. The local authorities require a great deal of training and support. They often are reluctant to enforce regulations and tend to act only on endpoint testing, yet the Inspectorate continues to promote risk assessment.

Several of the focus countries report problems with unregulated drillers – a lack of training, unfamiliarity with water quality issues, falsified borehole depths or not reporting boreholes at all. Estonia is weighing the possibility of charging private well owners for use of groundwater.

The session ended with participants dividing into buzz groups to come up with reasons for or against monitoring private wells. The devil's advocates in the group were able to come up with only a few arguments against such monitoring.

- It is a much better use of scarce resources to invest them in improving the monitoring of large public supplies, which affect many more people.
- It might be preferable to focus just on users who are especially vulnerable to waterborne illnesses, e.g., the immunocompromised and families with small children.
- Locating all the small wells is a fool's errand that is not worth the time.

The arguments for monitoring private wells were much more numerous.

- An improperly drilled well can contaminate the groundwater.
- Unanalysed wells can concentrate contaminants.
- Microbial contamination can cause a family to fall ill – and they can infect others.
- Monitoring private wells supports the human right to safe, clean drinking-water.
- In sparsely inhabited areas, it is more cost-effective to support individual supplies than to lay and maintain miles of pipe.
- Monitoring informs the prioritization and frequency of subsequent monitoring.
- It provides an opportunity to educate owners about how to safeguard water quality – and why it is important.
- Urbanization trends mean that private well use will diminish, and keeping tabs on wells allows abandoned wells to be shut down properly and thereby prevent the possible contamination of an entire water-bearing soil horizon.
- A significant portion of the population relies on private wells.
- Private wells are much likelier than other water sources to be non-compliant.
- Many owners do not have any alternatives to well water, and they have a vested interest in improving their water quality.
- Private wells often utilize the same aquifers as public wells or springs and can potentially pollute them.
- Monitoring ensures the proper drilling and construction of private wells, which should adhere to the same standards as public wells.
- Drinking-water standards ought to be the same for everyone, and monitoring enforces that.

Session 6. Sustainable financing of small water-supply and sanitation services

This session addressed sustainable financing, focusing on direct support costs and how to estimate them.

Sustainable financing is essential if water and sanitation systems are not to fail. It necessitates a shift from thinking about undertaking discrete projects, which require one-time investments, to thinking about delivering services over the long term, which involves recurrent costs and periodic upgrades. To understanding the sustainable financing requirements for a given system involves five steps:

1. assessing current assets and service levels
2. assessing current and ideal costs for sustainable service
3. assessing existing funding sources
4. comparing costs and funding resources (from Steps 3 and 4)
5. choosing financing mechanisms to cover the difference.

The session concentrated on Steps 2, 3 and 4. The costs in Step 2 can be divided into the following categories:

- capital expenditure – hardware and software investments in new schemes;
- operational and minor maintenance expenditure – electricity, chemicals, etc.;
- capital maintenance expenditure – rehabilitation, replacement and major repairs;
- direct support costs – post-construction activities (supervision, monitoring, surveillance, enforcement, technical assistance, planning and reporting);
- indirect support costs – macro-level planning and policy formulation, and training costs; and
- capital costs – loan interest.

Workshop participants broke into country groups to do a costing exercise focusing on the direct support costs of surveillance, using a costing tool available from IRC. The exercise involved first estimating the current costs of direct support for a representative water district, based primarily on the staff salaries needed to cover current surveillance activities, and then estimating the same costs for an ideal surveillance situation. The groups' back-of-the-envelope estimates for current direct support costs for surveillance ranged from €1 to €20 per user. Comparison of the two costing scenarios – the current and the ideal – makes it possible to prioritize activities better, and the results can be used to advocate for additional funding.

Step 4 involves estimating three types of funding sources: various tariffs (from users), taxes (from the government) and transfers (from donors). The two cost categories most likely to face funding shortfalls are capital maintenance and direct support.

The tool also has separate sheets to calculate capital expenditure and maintenance. It is available free online from IRC at <http://ircwash.org>, along with a variety of other costing and budgeting tools (under Tools) and occasional free online courses (under News). The European Centre for Environment and Health will be working with the IRC to make the tools available in Russian, and it will invites feedback on these tools when they are in the draft stage.

Participants were asked how direct support services, particularly surveillance, are financed in their countries – and if it is inadequate, how the funding gap might be closed. In **Belarus**, water and sanitation activities, including surveillance, are funded largely through tariffs, but since the government tries to keep tariffs relatively low, they must be supplemented by tax money. Surveillance of critical public facilities, such as bathing areas and schools, is provided without charge, but individuals and companies have to pay an additional fee if they wish to have their water analysed. **Estonia** finances all direct support services for water and sanitation systems through taxes; funding appears to be adequate. In **Latvia**, water and sanitation surveillance is carried out by the health authorities and funded by taxes. Surveillance levels are not what they should be, but the government has repeatedly refused to increase allocations; it is not clear how this gap can be bridged. The direct support costs of water suppliers are funded through tariffs set by the public utilities commission. In **Lithuania**, a similar tool is employed to set user tariffs. The tariffs do not cover surveillance, however, so following the workshop, it will be suggested to the health ministry that they incorporate surveillance costs as well. The **Republic of Moldova** finances surveillance services through a combination of tax revenue (for emergency services) and user fees. Many users – schools, for instance – have no resources for such expenditures. There are plans to expand governmental allocations for surveillance. In the **Russian Federation**, operational costs are covered by the government. Since there are not enough personnel, seven degrees of risk have been established to prioritize control activities. **Ukraine** is in the process of privatizing the water supply, due to a lack of money, though water tariffs have been increased. The health ministry provides monitoring services at a level determined in consultation with local governments.

Session 7. Improving small water-supply and sanitation systems

Participants were invited to reflect on the aspects of small water and sanitation systems that require the most attention in their respective countries, and what specifically they should concentrate on in the coming years.

Belarus has benefited immensely from hosting the workshop and thereby being able to expose people from many different Belarusian agencies and regions to the topics presented. It inspired plans to hold a workshop with the national regions on sanitary services, including a summary of the material presented here. One suggestion being considered is to incorporate a lecture on WSPs and SSPs in the training curriculum for sanitary–epidemiological staff. The workshop also provided an opening for further subregional cooperation and exchange and perhaps even joint actions.

Estonia has been ignoring small private water systems, but the workshop made a persuasive case for addressing the risks faced by the 13% of the population who get their drinking-water from them. SSPs are also unknown in the country, so the Estonian participants planned on sharing the approach with colleagues and exploring how it might be applied.

In **Latvia**, policy-makers need to be convinced of the importance of addressing small water supplies; this workshop helped articulate the arguments for doing so, and the Serbian and Moldovan experiences provided inspiring models for the steps to take. The risk-assessment tool for WSPs is worth considering in developing the national Protocol targets.

Lithuania is in a position similar to that of its Baltic neighbours with respect to small systems, yet before the workshop there had been little communication between the colleagues working on these issues in the different countries. It was expected that that would now change. Lithuania should develop new legislation to start addressing small systems. It would also make sense to

start incorporating health costs and savings into financial models for wastewater treatment and water-supply activities, similar to the way it is now done for the effects of activities on climate change. The environment and health ministries need to engage each other more on these issues. There had been some interest in the health department on WSPs and SSPs; this workshop was expected to inspire more dialogue, with an eye to adding a daylong workshop on small water supplies to an upcoming Baltic and Nordic health meeting that Lithuania is organizing.

While the **Republic of Moldova** is slowly but surely implementing the WSP approach, the workshop highlighted the importance of doing more to champion the rights of rural inhabitants to safe water and sanitation. The practical examples of SSP efforts were especially useful; the country needs to start applying the approach, even though the number of actors will make that somewhat complicated.

The workshop provided convincing arguments for monitoring private wells in the **Russian Federation**; they should no longer be considered a private affair. The financial aspects of small systems also need to be addressed. Given the vastness of the country, it makes sense to expand the use of low-tech analysis to monitor water quality on site. The country also needs to decide what to do with some of the immense pipelines – as long as 1200 km – that exist in some of its remote semiarid areas.

In **Ukraine**, there is some familiarity with the WSP and SSP approaches, but until now there have been some barriers to implementation. From meetings such as this one, however, it has become clearer which corrective measures need to be taken to move forward with these approaches.

Closing session: Conclusions and next steps

Conclusions

The workshop organizers drew up the following list of conclusions and next steps articulated during the course of the workshop.

Overarching themes

- Small water and sanitation systems need to be examined from a public health perspective.
- Neighbouring countries provide rich opportunities to collaborate and learn from each other's experiences.

Global context

- The Sustainable Development Goals call for safely managed water and sanitation services for all.
- The principles of universality and equity support increased attention to rural areas and small systems.

Regional context

- Small systems are a priority of the Protocol on Water and Health.
- Small-system issues can and should be included in national target-setting.

Small systems

- Widespread challenges for small systems include poor water-quality compliance, limited surveillance capacity, inadequate staffing and training, unsustainable financing and outdated systems.
- Some noteworthy tactics to address these challenges are connecting to larger (regional) operators, establishing financial support schemes, utilizing local authorities for advice, employing social media and developing smartphone-based solutions.

WSPs

- Based on risk-based principles, WSPs provide a public health benchmark for drinking-water supplies that is readily adaptable to varied national contexts. The step-by-step nature of WSPs facilitates the safe, effective management of small supplies.
- WSP implementation needs to be promoted at the national level, e.g. by integrating WSP-related requirements in regulations and norms for small or decentralized supplies, initiating pilots, disseminating case studies, developing guidance tools for operators and private owners, and raising awareness in the national water sector.
- Country action plans or roadmaps should be developed to implement the WSP approach.

Small sanitation systems and SSPs

- Sanitation requires looking at the entire waste chain. Major issues for small sanitation systems include a lack of information on the various elements of the waste chain, diffusion of responsibility among different actors and authorities, and the existence of many exposure groups.
- The goal of sanitation safety planning is to ensure that sanitation systems are managed to meet health objectives. SSPs identify and prioritize risks throughout the waste chain to improve waste collection, treatment and disposal.
- An SSP is a platform that brings diverse stakeholders together. It empowers public health advocacy while demanding – and reinforcing – health sector leadership.

Risk-based surveillance

- Risk-based surveillance provides a cost-effective way to address public health risks and guide interventions in the enormous number of small water-supply and sanitation systems.
- Targeted advocacy activities for decision-makers, capacity-building and strengthened regulatory requirements can all be used to promote risk-based surveillance. The EU directive on drinking-water can be used to introduce the risk-based approach for water systems.
- Monitoring parameters should be limited to a small set of core indicators plus others that are locally relevant. It is also important to monitor service levels and the performance of suppliers and authorities. Historical risk data can help determine which indicators to monitor, which sites to monitor and how often to conduct surveillance.

Private wells

- Private wells are the most unreliable type of water supply, with low compliance rates for water quality and poor sanitary conditions. They should therefore be subject to regulation and surveillance.
- A rapid assessment of private wells can be invaluable in raising political awareness of the issues and guiding programming.

- Support possibilities include social media, smartphone solutions for sanitary inspection and financial support schemes for well improvements.

Costing and financing

- All life-cycle costs – including recurrent costs such as operations, maintenance and support – need to be considered to ensure the long-term sustainability of a water-supply or sanitation system.
- Analysis of direct support costs can help define resourcing needs, depending on the political ambitions for health protection. It can also help inform decisions about the extent of surveillance activities.

Next steps

Mission possible #1 – a to-do list for participants

- ✓ Attend subregional workshop.
- Put WSP approach in place, or at least promote it.
- Make sure that rural sanitation and SSPs are on the policy radar.
- Incorporate risk-based principles in surveillance.
- Develop a plan to address the safety of private wells.
- Determine costs and allocate funding effectively.
- Establish targets for small systems within the Protocol context.

Mission possible #2 – a to-do list for the European Centre for Environment and Health

- Explore the possibility of translating the United Kingdom risk-assessment tool into Russian.
- Provide access to the IRC costing tool.
- Explore the possibility of working with the IRC to translate the tool to Russian and adapt it for the subregion.
- Assemble and disseminate a set of relevant case studies and tools.

Closing remarks

After presenting the conclusions and next steps on behalf of the organizers, Oliver Schmoll said that the workshop underscored the importance of looking at small water supply and sanitation systems from a health perspective, as well providing participants with the practical tools to do so. The meeting also showed how valuable it was for people working on these issues to network with colleagues from neighbouring countries, learn from each other's experiences, inspire planning and lay the groundwork for future cooperation.

Siarhei Sychyk, the director of the Center of Hygiene, closed the workshop by noting that Soviet regulations in the subregion were based on maximum viable concentrations of contaminants, and they did not consider the concept of acceptable risk. He endorsed the workshop's emphasis on how risk-assessment models can be used to better safeguard public health. He thanked the sponsors and organizers of the workshop, which he said had provided inspiration to the many Belarusian participants, and he applauded the participants from abroad for coming to Minsk to learn from the experiences of others working on the issues of small water and sanitation systems and strengthen ties among the countries of the subregion.

Annex 1

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Annex 2

WORKSHOP PROGRAMME

Wednesday, 15 March 2017	
09:00–09:30	Registration
09:30–10:00	<p>Welcome and opening <i>Natalia Zhukova, Deputy Minister of Health, Belarus</i> <i>Batyr Berdyklychev, Head of WHO Country Office Belarus</i> Introduction of meeting objectives and expected outcomes (<i>Oliver Schmoll, WHO Regional Office for Europe</i>) Introduction of participants Nomination of meeting officers</p>
10:00–11:15	<p>Session 1: Situation of small-scale water supply and sanitation services Chairs: <i>Siarhei Sychyk and Alena Drazdova</i> Why are we concerned of small-scale water supplies and sanitation? (<i>Oliver Schmoll</i>) Questions and answers Country presentations on the situation of small-scale water supply and sanitation systems: <ul style="list-style-type: none"> - Belarus - Estonia - Ukraine Questions and answers</p>
11:15–11:45	Morning break
11:45–12:45	<p>Session 1 (continued) Country presentations on the situation of small-scale water supply and sanitation systems: <ul style="list-style-type: none"> - Latvia - Lithuania - Republic of Moldova - Russian Federation Questions and answers</p>
12:45–14:15	Lunch break
14:15–15:15	<p>Session 2: Scaling up Water Safety Plan (WSP) approach in small-scale systems Chair: <i>Dragana Jovanovic</i> Introduction to the WSP approach: key steps and benefits (<i>Arnt Diener and Oliver Schmoll</i>) Case study: Application of risk assessment tool in small private supplies in the United Kingdom (<i>Laura Moss</i>) Questions and answers</p>
15:15–15:45	Afternoon break

15:45–17:45	<p>Session 2 continued</p> <p>Case study: Capacity building and development of a national guideline on WSP in the Republic of Moldova (<i>Ion Salaru</i>)</p> <p>Roadmap for uptake and scale-up of the WSP approach (<i>Oliver Schmoll</i>)</p> <p>Questions and answers</p> <p>Moderated roundtable discussion on main steps towards uptake and scale-up of the WSP approach</p>
17:45	Closure Day 1
Thursday, 16 March 2017	
09:00–10:30	<p>Session 3: Sanitation Safety Planning (SSP) approach</p> <p>Chair: <i>Oliver Schmoll</i></p> <p>Introduction to Sanitation Safety planning (<i>Raquel Mendes</i>):</p> <ul style="list-style-type: none"> - Why SSPs? - What is a SSP? - Interactive demonstration exercise: key steps in rural sanitation planning - How will the SSPs work in small systems context? <p>Questions and answers</p>
10:30–10:45	Morning break
10:45–12:15	<p>Session 3 continued</p> <p>Rotating group work: How to move forward with SSPs in small systems context?</p> <ul style="list-style-type: none"> - Group discussions - Feedback to the plenary - Wrap up
12:15–13:45	Lunch break
13:45–15:15	<p>Session 4: Monitoring and surveillance of small-scale services</p> <p>Chair: <i>Arnt Diener</i></p> <p>Consideration for drinking-water quality surveillance in small-scale systems (<i>Enkhtsetseg Shinee</i>)</p> <p>Case study: Outcomes of rapid assessment of drinking-water quality and prevailing sanitary conditions of small-scale water supply systems in rural Serbia (<i>Dragana Jovanovic</i>)</p> <p>Monitoring water services: monitoring practices and use of data (<i>Marieke Adank</i>)</p> <p>Questions and answers</p>
15:15–15:45	Afternoon break
15:45–16:30	<p>Session 4 continued</p> <p>Round-table discussion on monitoring and surveillance of small-scale systems: current practices, challenges and improvement needs</p>
16:30–18:00	<p>Session 5: Focus on private (individual) wells</p> <p>Chair: <i>Oliver Schmoll</i></p> <p><i>Buzz groups:</i> What are the issues with management of private wells?</p> <p>Case study: Results of assessment of individual wells in Serbia (<i>Dragana Jovanovic</i>)</p> <p>Case study: Regulations on private water supplies in England and Wales (<i>Laura Moss</i>)</p> <p>Questions and answers</p> <p>Country statements from Belarus, Estonia and Lithuania</p> <p><i>Buzz groups:</i> What improvement actions are needed?</p>
18:00	Closure Day 2

Friday, 17 March 2017	
09:00–11:15	<p>Session 6: Sustainable financing of small-scale water supply and sanitation services Chair: <i>Enkhtsetseg Shinee</i> Introduction to cost categories: direct support costs (<i>Marieke Adank</i>) Questions and answers Introduction to costing tools (<i>Marieke Adank</i>) Exercise in country-groups: estimating direct support costs Feedback of group work outcomes to plenary Financing water service costs (<i>Marieke Adank</i>) Moderated discussion on financing of direct support costs</p>
11:15–11:45	Morning break
11:45–12:45	<p>Session 7: Improving small-scale water supply and sanitation systems Moderators: <i>Oliver Schmoll and Enkhtsetseg Shinee</i> Concluding roundtable discussion on steps towards improving the situation of small-scale water supplies and sanitation systems</p>
12:45–13:00	<p>Summary and conclusions Closure of the workshop</p>

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