

# **Status of small-scale water supplies in the WHO European Region**

**Results of a survey conducted under the  
Protocol on Water and Health**

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## 1. Introduction

About one third of the population of the WHO European Region lives in rural areas, where small-scale water supplies are typically in use.<sup>1</sup> Although many such small-scale systems exist, however, there is a lack of detailed and systematic information on how many there are and where they are prevalent. No mechanism has been in place to date to facilitate regular systematic collection of information on small-scale water supplies at the regional level.

Small-scale systems include both individual systems and small centralized systems. They share a range of common managerial, financial and institutional challenges and particularities that may impair the provision of safe and sustainable services. They are more vulnerable to inadequate management and breakdown. If they are dysfunctional, this can lead to unsafe services or insufficient quantities of drinking-water, which may lead to health consequences.<sup>2</sup> Ensuring equitable access to safe and sustainable drinking-water services is key to the building of healthy and resilient communities in rural areas and small towns, as stipulated by the European health policy framework, Health 2020. For meeting the aspirations of the 2030 Agenda for Sustainable Development, especially Goal 3 „Ensure healthy lives and promote well-being for all at all ages“ and Goal 6 „Ensure availability and sustainable management of water and sanitation for all“, due policy attention needs to be paid to the particularities of small-scale systems, which ideally builds on a sound evidence base.

Increasing policy attention and action to improve the situation of small-scale water and sanitation systems is a priority area under the Protocol on Water and Health<sup>3</sup> to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes – which is jointly serviced by the United Nations Economic Commission for Europe and WHO Regional Office for Europe. Under the Protocol's programmes of work a collection of recognized tools that are available to policy-makers and good practices has been compiled to improve the situation of small-scale systems in a sustainable manner.

To further improve the evidence base on small-scale water supplies and to gain a better overview of the status quo throughout the WHO European Region a survey has been undertaken in 2012-2013 which requested country-specific information on regulations in place, numbers and types of small-scale water supplies, raw water sources used, operators and organization of such supplies and drinking-water quality.

This report summarizes the findings of the survey which will inform policy making and the formulation of intervention strategies at the level of the WHO European Region and help identifying further joint action under the Protocol on Water and Health.

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<sup>1</sup> <http://www.wssinfo.org/data-estimates/tables/>

<sup>2</sup> Small-scale water supplies in the pan-European region: background, challenges, improvements. Copenhagen: WHO Regional Office for Europe; 2011 (<http://www.euro.who.int/en/health-topics/environment-and-health/water-and-sanitation/publications/2011/small-scale-water-supplies-in-the-pan-european-region.-background.-challenges.-improvements>, accessed 15 October 2014).

<sup>3</sup> Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Geneva: UNECE and WHO Regional Office for Europe; 2006 (<http://www.euro.who.int/en/publications/policy-documents/protocol-on-water-and-health-to-the-1992-convention-on-the-protection-and-use-of-transboundary-watercourses-and-international-lakes>, accessed 15 October 2014).

## 2. The questionnaire and responding countries

For the purpose of the survey a questionnaire on small-scale water supplies was developed (see Appendix 1) which was divided into five sections:

- section I: legal and regulatory requirements;
- section II: numbers of small-scale water supplies;
- section III: raw water sources used by small-scale water supplies;
- section IV: operators and organization of small-scale water supplies;
- section V: quality of drinking-water provided by small-scale water supplies.

The questionnaire was made available in Russian and English and in June 2012 sent to health and environment ministries of the 53 Member States in the WHO European Region<sup>4</sup>, national focal points of the Protocol and WHO country offices. Other networks were also utilized to reach the target audience for a high response rate. In total, 50 questionnaires were returned between July 2012 and May 2013. Responses were received in English and Russian, and Russian responses were translated into English to facilitate data analysis. Box 1 provides an overview of the questionnaire distribution and responses.

Box 1. Overview of questionnaire distribution and responses

<p>The questionnaire was distributed to the 53 Member States in the WHO European Region. In total, 43 countries returned 50 questionnaires.</p>
<p>This assessment analysed 47 questionnaires returned from 43 countries: Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, the Republic of Moldova, Romania, the Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the former Yugoslav Republic of Macedonia, Turkey and the United Kingdom of Great Britain and Northern Ireland. These included:</p> <ul style="list-style-type: none"><li>• 29 questionnaires from 26 European Union (EU) countries;</li><li>• 18 questionnaires from 17 non-EU countries.</li></ul>
<p>Several countries returned more than one questionnaire.</p> <ul style="list-style-type: none"><li>• Armenia and Azerbaijan returned two questionnaires each; these were compiled into one questionnaire for each country for the purpose of the assessment.</li><li>• Belgium returned two questionnaires for the regions of Wallonia and Flanders; both were analysed in the assessment.</li><li>• Bosnia and Herzegovina returned two questionnaires for the Republic of Srpska and the Federation of Bosnia and Herzegovina, both of which were analysed in the assessment. In addition, one local community returned a questionnaire; this was not representative of the national situation and was therefore not included in the assessment.</li></ul>

<sup>4</sup> The WHO European Region comprises the following 53 countries: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, the Republic of Moldova, Romania, the Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, the former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, the United Kingdom of Great Britain and Northern Ireland and Uzbekistan.

- The United Kingdom returned three questionnaires for the regions of England and Wales, of Scotland and of Northern Ireland; all were analysed in the assessment.

The following 10 countries did not return the questionnaire: Albania, Bulgaria, Iceland, Israel, Italy, San Marino, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

The 43 countries which were included in the assessment cover a total population of 736 million, representing 82% of the population of the Region. Among the survey respondents, the country with the smallest population was Monaco (35 427 inhabitants); the country with the largest population was the Russian Federation (143 million inhabitants). The population data used to calculate the coverage of the responding countries on particular questions are based on the WHO/UNICEF Joint Monitoring Programme (JMP) data presenting the situation in 2011.<sup>5</sup>

### 3. Methodology

In the analysis of the returned questionnaires the authors made the following choices and assumptions.

Where several responses were received from different regions for one country (in the cases of Belgium, Bosnia and Herzegovina and the United Kingdom; see also Box 1), they were analysed separately for the purpose of the assessment. Information provided for only one of the regions in any of these countries was considered to represent the situation in the entire country and was hence extrapolated, unless otherwise stated. Armenia and Azerbaijan returned two questionnaires each; these were compiled into one questionnaire for each country for the purpose of the assessment. If the two questionnaires from one country contained conflicting answers to a question, however, those responses were not included in the analysis.

Several responders provided only part of the information requested. As a result, the assessment does not provide a full picture of the situation of all 43 responding countries for all questions.

The results presented in this report are based on the survey responses only; they have not been extrapolated to the number of people the resulting percentage would correspond to for the entire WHO European Region, unless otherwise stated.

The questionnaire provided a range of questions, the answers to which were requested as a mix of free text answers, tick-boxes and tables. In some questionnaires the respondents did not use the tick-boxes to indicate the answer but instead provided the information in supplementary text. In such cases the authors chose to interpret the data as though the box had been ticked, where possible. When an answer was not provided directly in the related text or table but was available in another section, the authors transferred the information to the relevant section. Where information provided appeared non-plausible (e.g. if total numbers added up to more than 100%), unclear or not relevant within the scope of the survey, it was not further considered in the analysis.

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<sup>5</sup> WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation [website]. Geneva: World Health Organization and United Nations Children's Fund; 2014 (<http://www.wssinfo.org/data-estimates/tables/>, accessed 15 October 2014).

To gather data about the numbers of small-scale water supplies in the Region, the survey's questions were structured around the following supply categories:

- supplies serving up to 50 people;
- supplies serving 51–500 people;
- supplies serving 501–5000 people;
- individual supplies.

Nevertheless, because of the differing definitions of small-scale water supplies, the questionnaire also enabled countries to provide information according to their defined supply categories or format (i.e. if no data could be provided according to the aforementioned categories). As a result, several answers expressed the size of the water supply as either the number of people served or the volume of water produced or distributed per day. In order to compare and plot the results, for the purpose of the assessment the following equivalence estimates were used:

- a supply serving up to 50 people is equivalent to one with a volume of up to 10 m<sup>3</sup> per day;
- a supply serving 51–500 people is equivalent to one with a volume of over 10 m<sup>3</sup> and up to 100 m<sup>3</sup> per day;
- a supply serving 501–5000 people is equivalent to one with a volume of over 100 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day.

In case information was provided in a category which only slightly differed from the category given in the questionnaire (e.g. for supplies serving 50-499 persons instead of 51-500), it was interpreted as being the same category.

Where information was given, for example, about the number of people served by individual supplies, rural supplies, decentralized or non-piped supplies or supplies serving up to 50 people, all these types of supply were considered as the same category and the information was merged, unless otherwise stated.

### 3. Results of the assessment

#### 3.1. Definitions and categories of small-scale water supplies

The term “small-scale water supply” is not defined or understood in a uniform way for the entire WHO European Region but differs from country to country. A definition of small-scale water supplies can be based on criteria such as size of population served, quantity of water provided, number of households connected, type of management (by communities, public entities or individuals), piped or non-piped distribution, centralized or non-centralized and similar. For the purpose of this survey, the definitions provided in Box XY were used. The questionnaires requested that information be given for these categories wherever possible but also provided the option to give other definitions as used in the responding countries.

Box XY. Definitions for small-scale water supplies used in the survey

“Small-scale water supply”: all drinking-water supplies serving up to 5000 people or supplying less than 1000 m<sup>3</sup> water per day. This category includes both individual supplies and small public supplies (see definitions below).

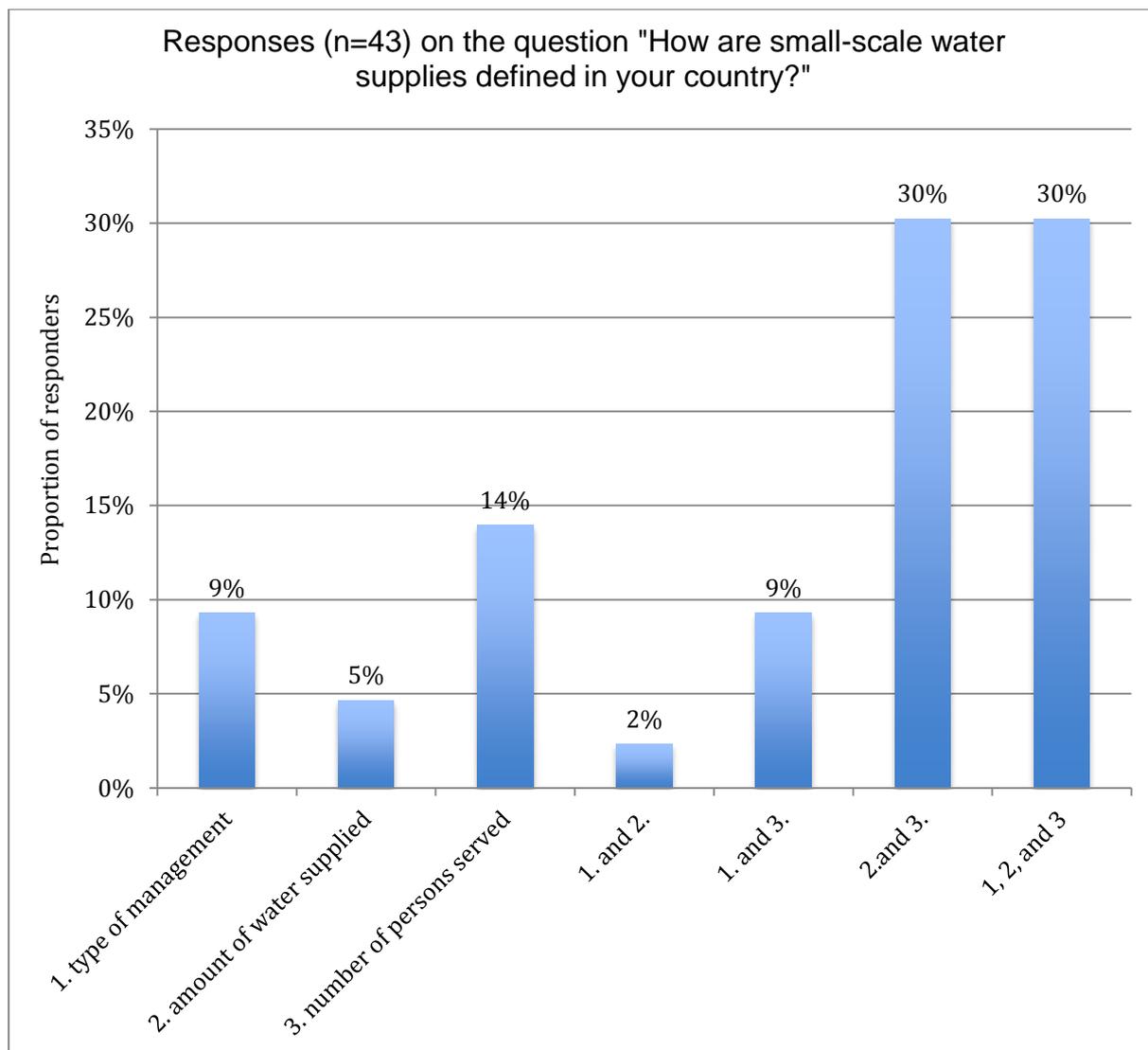
“Public supply”: piped drinking-water supplies or non-piped sources (such as public wells or springs) that are managed and operated by a distinct organized public or private entity. This may be a water utility, municipality, village community, association, joint board or cooperative, for example, that is specifically mandated with the task of drinking-water supply as one of its main tasks. Such supplies may also supply commercial premises (such as hotels, restaurants and food production sites) with drinking-water.

“Individual supply”: a groundwater well, spring source or surface water intake that typically supplies drinking-water to one or two premises only. Management of the supply is usually the responsibility of one individual who is not a water management professional. Individual supplies may also serve more than one or two premises (for example, in hamlets) and may supply commercial premises (such as hotels, restaurants and food production sites) with drinking-water.

The questionnaire asked respondents how small-scale water supplies were defined in their country, offering the choice of one or more of the following tick-boxes: “by type of management (public/individual supplies)”, “based on the amount of water supplied” and “based on the population served”.

Information on the definition of small-scale water supplies was provided in 43 questionnaires from 39 countries with a total population of 714 million, representing 79% of the population of the WHO European Region. Definitions of small-scale water supplies are based on a combination of the type of management, amount of water supplied and number of people served in 72% of the responding countries (the precise combination differs from country to country). In about one third of the responding countries definitions are based only on one criterion: 14% indicated that the definition was based only on the number of people served, 9% that it was based only on the type of management and 5% that it was based only on the amount of supplied water (see Fig. 1).

Fig. 1. Bases for definitions of small-scale water supplies



Several countries provided further details on the definitions used. In general, EU countries consider the supply small-scale when it serves fewer than 5000 people or has a size of up to 1000 m<sup>3</sup> per day. A number of other approaches to defining the type of water supply are in use, resulting in other terms and categories for small water supplies (see Box 2).

**Box 2. Examples of definitions and terms used for small-scale water supplies and types of management provided by selected countries**

In Belarus the relevant law classifies supplies as centralized or non-centralized drinking-water supplies rather than referring to the number of people served or the amount of water supplied. "Non-piped drinking-water supplies" refer to a set of devices and structures (such as a dug well, borehole or standpipe) providing certain individuals or groups of consumers with drinking-water.

In Bosnia and Herzegovina (Republic of Srpska) small-scale water supplies are categorized as small village/rural/local water resources serving more than five households and supplying less than 5000 population equivalents of drinking-water (population

equivalent is 120 litres per day).

Croatia's response stated: "Small-scale water supply systems, known as local water supply systems in Croatia, include systems that deliver water to more than 50 people, are not registered and are not under regular sanitary inspection. Those systems are managed by the residents. Public water supply systems include all systems that are registered and under regular sanitary inspection; some of them serve fewer than 5000 inhabitants but are not part of small-scale water supplies."

In Montenegro water supply systems are defined by law in the following categories.

- A public water supply system comprises a set of interconnected technical and sanitary facilities and equipment, constructed for the supply of sanitary safe water to the public and industry in urban settlements.
- A regional water supply system supplies water to two or more settlements in the territory of two or more municipalities.
- A local water supply system supplies water to one or a group of houses or industries.
- A rural water supply system supplies water to a whole or part of rural settlement.

In the Republic of Moldova, small-scale water supplies are defined as those providing less than 5 m<sup>3</sup> per day or serving fewer than 50 people. This category includes departmental water supplies serving small businesses, small rural public water supplies, non-piped or non-centralized water supplies (wells and springs) and separate boreholes without a distribution network.

The Russian Federation categorizes small-scale water supplies as individual, non-piped and rural water pipes.

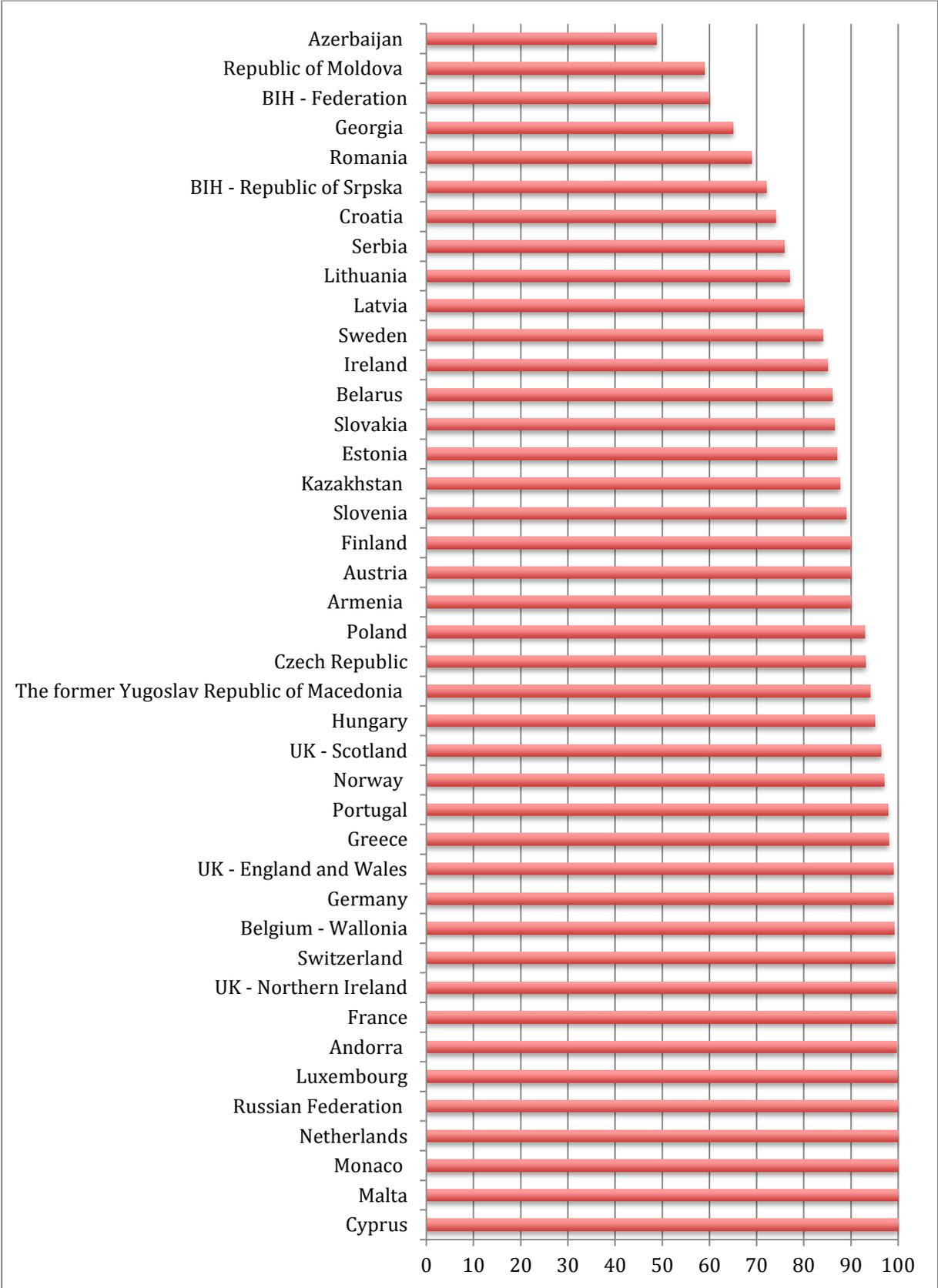
Serbia has no official definition of small-scale drinking-water supplies but classifies them by type of settlement and water facility. Thus, drinking-water supply systems that supply rural areas are small-scale/local water supplies and those supplying urban areas are central water supply systems.

Belgium (Wallonia) stated that small-scale water supplies are all public supplies delivering less than 1000 m<sup>3</sup> per day and serving fewer than 5000 inhabitants, as well as all "individual supplies" delivering more than 10 m<sup>3</sup> per day or serving more than 50 inhabitants and drinking-water supplied in the context of a commercial or tourist activity. Consequently, individual supplies feeding one or two private premises are generally not considered water supplies.

### 3.2. Public water supply coverage

Information on the proportion of the population served by public water supplies (including large and small-scale supplies but excluding individual supplies) was provided by 41 questionnaires returned from 38 countries with a total population of 605 million, representing 67% of the population of the WHO European Region (see Fig. 2). The respondents indicated that the information provided was based on statistical data in 71% of responses, on estimates or expert judgements in 24% and on both in 5%.

Fig. 2. Proportion of population coverage by public supplies in responding countries

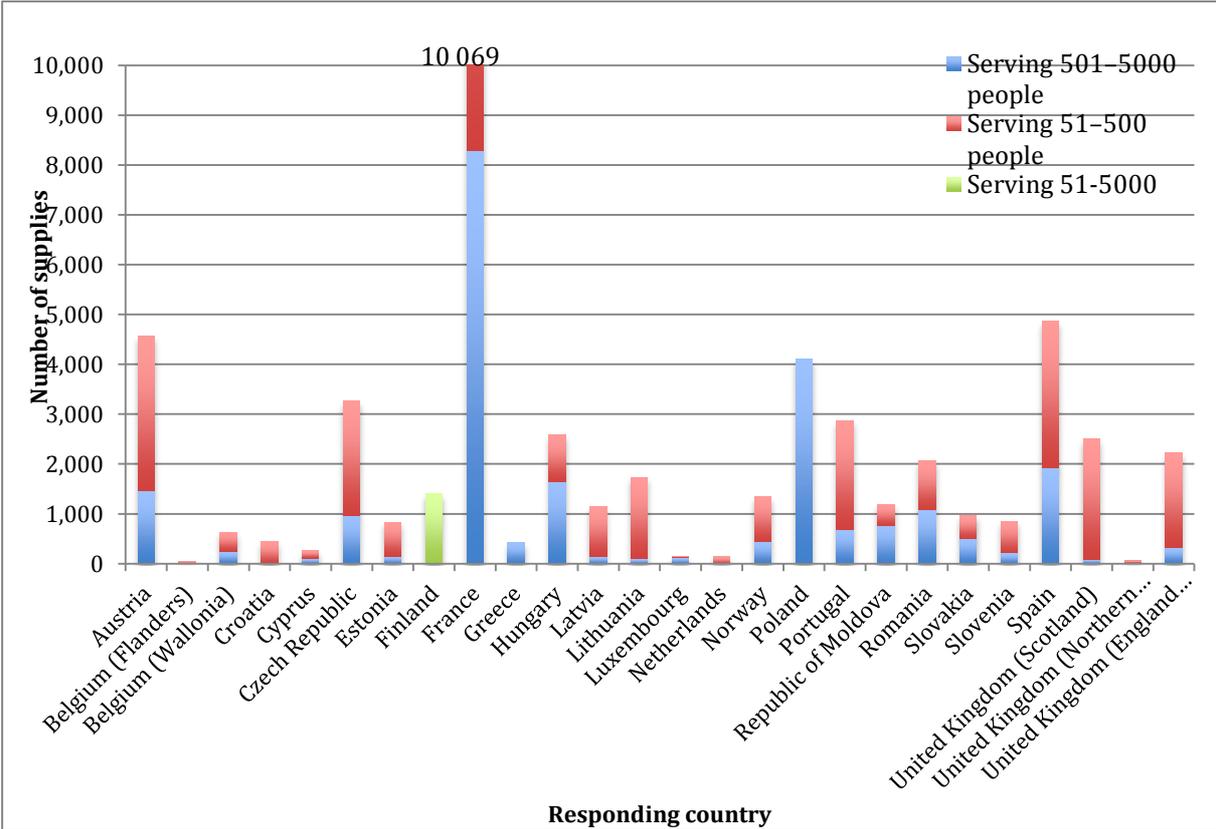


### 3.3. Prevalence of small-scale water supplies in the WHO European Region

#### 3.3.1. Water supplies serving 51–5000 people

Information about the number of small-scale water supplies serving 51–500 people and/or 501–5000 people was provided by 27 questionnaires returned from 24 countries with a total population of 345 million, representing 38% of the population of the WHO European Region (see Fig. 3).

Fig. 3. Numbers of small-scale water supplies serving 51–5000 people in responding countries<sup>6</sup>



The respondents indicated that the information provided was based on national statistical data in 77% of responses and on estimates or expert judgements in 23%.

The highest numbers of small-scale water supplies in these categories were presented by France, with 8294 supplies serving 501–5000 people and 10 069 supplies serving 51–500 people. Malta reported only one small-scale water supply serving 51–500 people and six serving 501–5000 people (these numbers are too low to appear in Fig. 3).

#### 3.3.2. People receiving water from supplies serving 51–5000 people

Information was provided on the number of people receiving their drinking-water from these supplies by 25 questionnaires returned from 22 countries with a total population of 323 million, representing 36% of the population of the WHO European

Region. The assessment showed that in these countries a total of 52 million people (16% of the combined population) receive water from 61 855 supplies serving 51–5000 people (see Table 1).

Table 1. Number and proportion of population receiving water from small-scale supplies serving 51–5000 people in responding countries

<b>Water supply category</b>	<b>Total number of supplies</b>	<b>Total number of people served (millions)</b>	<b>Total population of the countries of the 25 responses (millions)</b>	<b>Proportion of this population served (%)</b>
Serving 501–5000 people	23 902	43	323	13
Serving 51–500 people	37 953	9		3
Total	61 855	52		16

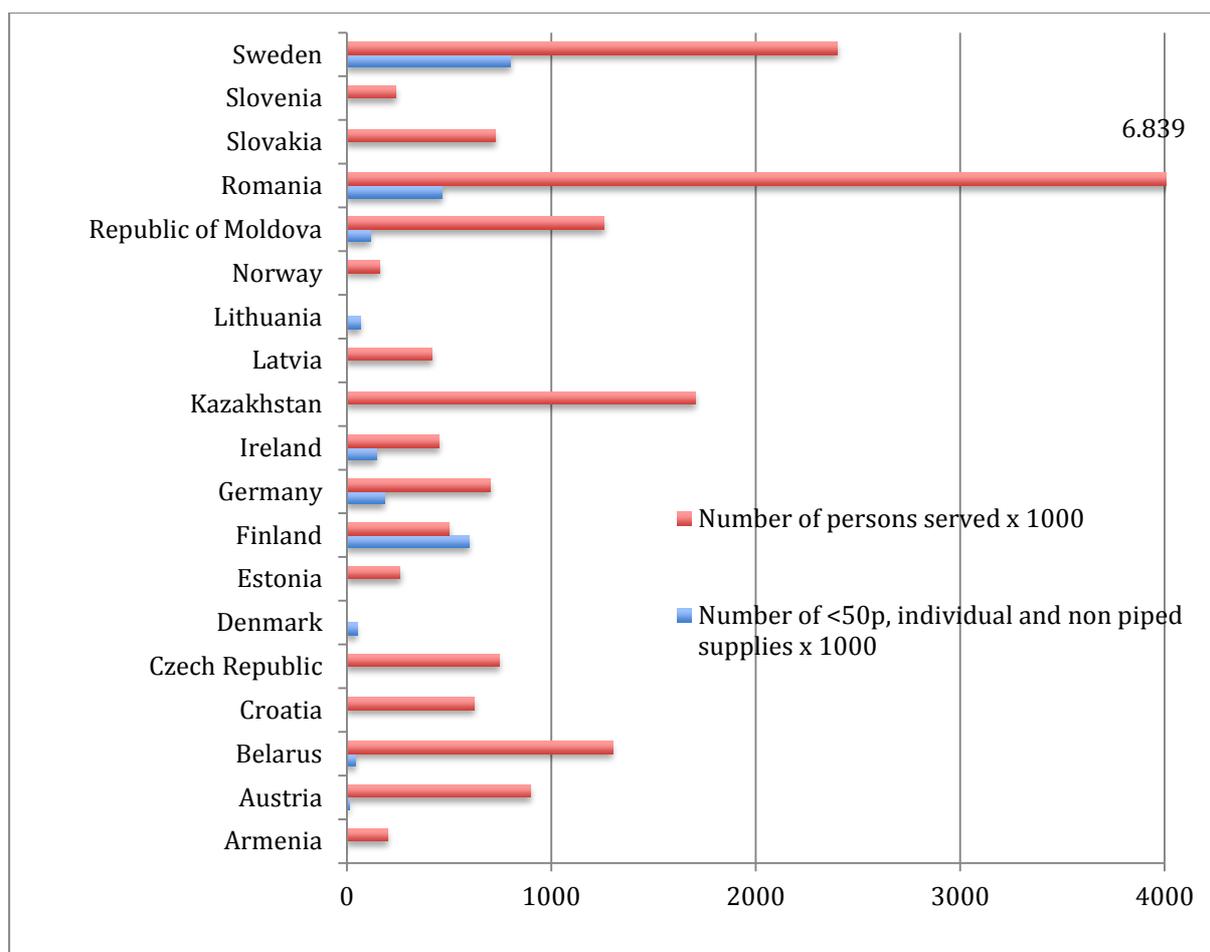
### 3.3.3. Individual and non-piped supplies and supplies serving up to 50 people

Information about the number of people receiving water from individual and non-piped supplies and supplies serving up to 50 people, and/or the number of such supplies, was provided by 28 questionnaires returned from 27 countries with a total population of 291 million, representing 32% of the population of the WHO European Region<sup>7</sup>).

Among the responding countries, those with the highest numbers of population receiving water from this category of small-scale supplies were Romania with 7 million people and Sweden and Kazakhstan with approximately 2 million people each (see Fig. 4). Luxembourg and Andorra were the countries with the lowest numbers receiving water from this category, at 20 and 250 people respectively.

Fig. 4. Number of individual and non-piped supplies and supplies serving up to 50 people; number of people receiving water from these supplies in responding countries

<sup>7</sup> For the purpose of this part of the assessment, only the population of the UK regions Northern Ireland and Scotland was considered as no information on number of people served by individual supplies was provided by the England and Wales region.



Note: Only countries reporting more than 150 000 people receiving water from this category of supply are included due to the scale of data depicted. Furthermore, not all responding countries provided information about the number of related supplies.

Based on the information provided by the 27 responding countries, it was estimated that a total of 20 million or 7% of the population is served by individual and non-piped supplies and supplies serving up to 50 people.

### 3.3.4. Raw water sources used

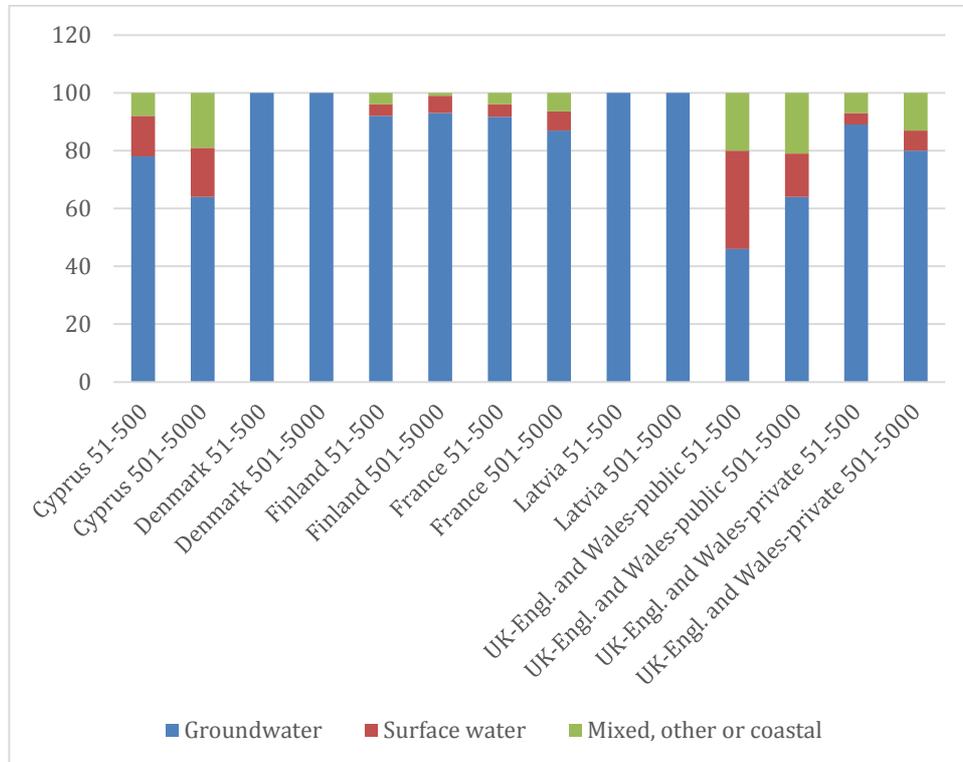
Information about the raw water sources used by small-scale (and/or all) water supplies was provided by 40 questionnaires returned from 37 countries with a total population of 638 million, representing 71% of the population of the WHO European Region.

If data were available, the questionnaire asked countries to separate the raw water sources into supply categories.

Of the questionnaires returned, 13 provided information only about the raw water sources used for all supplies, and 5 provided information on both raw water sources used for small systems, and for all supplies. 5 responses provided information about the number of people served by the different types of raw water sources; as the percentage of related water supplies was not given, the questionnaires were not included in the related assessment.

Groundwater was the most dominantly used water source for small-scale water supplies (see Fig. 5). For 12 countries groundwater was the only or main type of water source, while in some countries spring water or surface water were important sources.

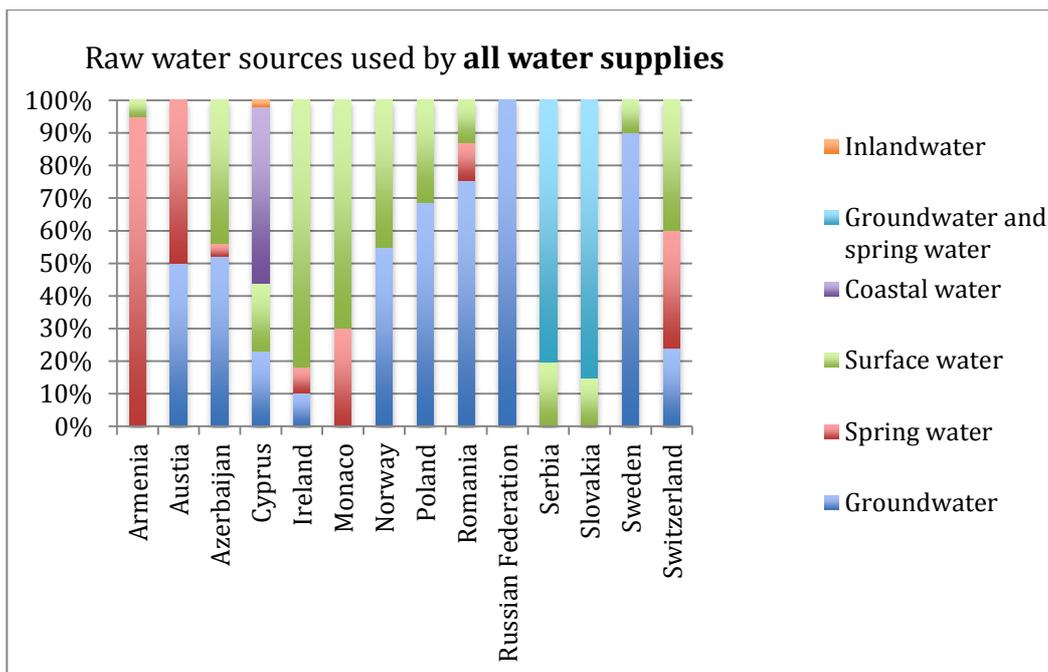
Fig. 5. Raw water sources used by small-scale water supplies serving 51-500 and 501-5000 people in responding countries



In Hungary, an additional type of source – karstic water (underground water reservoirs created in limestone areas) – is used for small-scale water supplies in the country, and in Malta desalinated water is used.

Those countries that could not provide information about the sources used by small-scale supplies were asked to give information about the raw water sources used by all supplies. A wide variety of sources was observed among the countries as shown by Fig. 7.

Fig. 6. Raw water sources used for all water supplies in responding countries



### 3.4. Legal and regulatory requirements and responsibilities for the management of small-scale water supplies

#### 3.4.1. Legal and regulatory requirements for drinking-water supplies

All questionnaires returned from the 43 countries with a population of 736 million, representing 82% of the population of the WHO European Region, provided information on the legislation and regulations applying to drinking-water supplies. Based on the information received, the regulatory requirements of the countries in the WHO European Region can be divided into two groups. The first group includes countries that are members of the EU, which have developed national legislation based on the EU Drinking Water Directive.<sup>8</sup> The second group consists of non-EU members, including countries from the newly independent states (NIS),<sup>9</sup> which reported several acts and orders, mainly established after 1990.

The Drinking Water Directive includes requirements for quality standards and the minimum frequency of sampling and analysing water intended for human consumption. The more drinking-water is distributed, the more sampling and analysis is required.

- If the volume of water distributed is equal to or less than 100 m<sup>3</sup> per day, the frequency and number of samples can be decided nationally by countries (>0 samples).
- Supplies distributing or producing within a supply zone over 100 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day (and/or serving 501–5000 people) should monitor four samples per year.

<sup>8</sup> Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption. OJEC. 1998, L 330/32 (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:330:0032:0054:EN:PDF>, accessed 20 October 2014).

<sup>9</sup> The NIS are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

- Supplies producing higher volumes than 1000 m<sup>3</sup> per day (and/or serving more than 5000 people) are required to monitor three further samples for each additional 1000 m<sup>3</sup> per day (or part thereof) of the total volume produced.

The Drinking Water Directive is binding for EU countries, which are obliged to include its requirements in national legislation. It allows countries to exempt individual supplies providing less than 10 m<sup>3</sup> of water per day or serving fewer than 50 people from some monitoring specifications, however, and therefore each country can decide whether or not to include individual supplies in regulations.

All 29 questionnaires returned from the 26 responding EU countries with a population of 439 million, representing 49% of the population of the WHO European Region, reported that national legislation on drinking-water supplies exists. Of these 29 responses, two countries (Lithuania and the Czech Republic) listed a law in which drinking-water supply and wastewater management are jointly regulated.

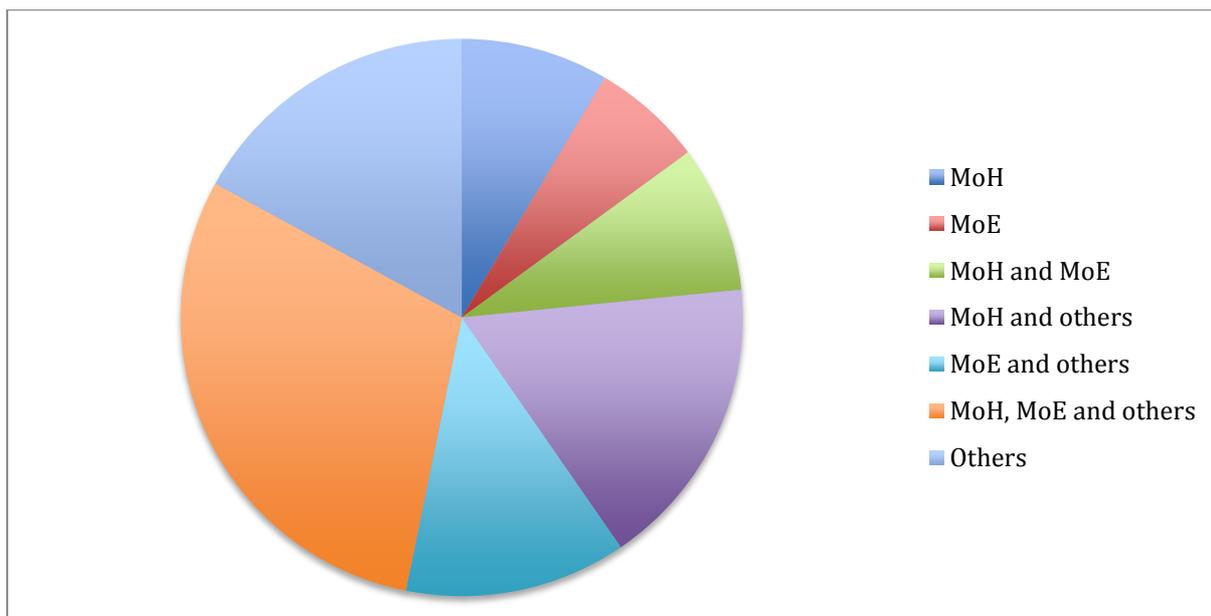
All 18 questionnaires returned from the 17 responding non-EU countries with a population of 297 million, representing 33% of the population of the WHO European Region also stated that legislative requirements, standards and “sanitary norms” on water supply were established. Several NIS countries presented laws or decrees addressing the sanitary and epidemiological well-being or hygienic welfare of the population.

### **3.4.2. Institutions responsible for regulating water supply**

All questionnaires returned from the 43 countries with a population of 736 million, representing 82% of the population of the WHO European Region, provided information on the institutions responsible for regulating water supply. The responses indicated a broad diversity of institutions responsible for regulating the water supply. While the majority of responding countries indicated that responsibilities were shared by several institutions, 19% of responses indicated that one institution had exclusive responsibility. Of the 47 responses, four indicated that the ministry of health alone and three indicated that the ministry of the environment alone was responsible for regulating the water supply.

In 30 cases (64%) the ministry of health and in 27 cases (57%) the ministry of the environment had either shared or sole responsibility for regulating the water supply (see Fig. 8). The next most frequently mentioned institution was the ministry of agriculture, in 13 cases (28%).

Fig. 7. Institutions responsible for regulating water supply in responding countries



The questionnaires also mentioned a wide diversity of other stakeholders as legal actors (shown as “others” in Fig. 8). These included the Ministry of Agriculture in several cases, the State Committee for Water Management of the Ministry of Territorial Administration (Armenia), regional governments and the Ministry of Municipalities and Living Conditions (Belgium), the National Food Agency, governed by the Ministry of Rural Affairs (Sweden), and the Federal Ministry of Economics and Technology (Germany).

### 3.4.3. Legal and regulatory requirements for small-scale water supplies

On the question of how far legal and regulatory requirements apply to small-scale water supplies (individual and public supplies), information was provided by 45 questionnaires returned from 41 countries with a total population of 663 million, representing 73% of the population of the WHO European Region. Countries responded by ticking one or more of the five related boxes and/or by providing free text. Several countries ticked two or three boxes.

Of the 45 questionnaires:

- 39 (87%) returned from 36 countries indicated that all legal and regulatory requirements apply to public small-scale water supplies;
- 17 (39%) returned from 17 countries mentioned explicitly exemptions for supplies serving up to 50 people, mostly stating that this only refers to those not used for commercial purposes, or have separate legal requirements for these supplies;
- 16 (36%) returned from 13 countries (including responses from 10 EU countries) indicated that the legal and regulatory requirements for drinking-water also apply to individual water supplies, with some countries indicating that this only applies to individual supplies producing water for commercial activities;
- eight (18%) indicated that none of the legal and regulatory requirements apply to individual supplies;
- only one indicated that none of the requirements apply to public small-scale supplies.

#### 3.4.4. Additional non-statutory guidance

Information on additional non-statutory guidance for small-scale water supplies was provided by 43 questionnaires from 39 countries with a total population of 640 million, representing 71% of the population of the WHO European Region; some of it addressed small-scale systems specifically. The additional guidance often addressed practical issues. Examples include:

- requirements for monitoring parameters;
- handbooks on providing reference standards;
- sanitary rules for wells, catchments and springs used for non-piped domestic and drinking-water supply;
- qualifications requirements for well-drillers;
- guidance documents for the preparation of rural water strategic plans and for treatment for group water schemes;
- information booklets and training for the efficient operation of small water supplies.

#### 3.4.5. Source water protection measures

In 46 questionnaires returned from 42 countries with a total population of 736 million, representing 82% of the population of the WHO European Region, information was provided on requirements for protection of water sources in small-scale water supply catchment areas. In many responses the information provided was rather general and referred to EU regulations (such as the EU Water Framework Directive).

Regulations on water protection measures in small-scale water supply catchment areas were reported to be in place in 37 questionnaires (80%) from 35 countries; six countries (13%) indicated that no regulations were available for source water protection measures in small-scale water supplies catchments.

#### 3.4.6. Requirements for qualifications and training programmes for operators

On the question of minimum qualifications or competence requirements for operators of small-scale public water supplies, information was provided by 42 questionnaires returned from 39 countries with a total population of 647 million, representing 72% of the population of the WHO European Region.

Of the 42 questionnaires assessed, 22 (52%) returned from 21 countries indicated that minimum qualifications or competences were required for operators of small-scale public supplies and 20 (48%) returned from 19 countries indicated that no qualification was required.

The questionnaire also asked whether any relevant qualifications or training programmes were available for operators of small public supplies. Of the 42 questionnaires assessed, 21 (50%) returned from 19 countries indicated that training programmes are available and in 18 (43%) from 18 countries this is not the case.

Of the 19 responses that indicated no minimum qualification or competence requirement for operators of small-scale supplies are in place, 8 (42%) mentioned that training programmes for operators were available.

### 3.5. Surveillance requirements for small-scale water supplies

Information about requirements for regular independent monitoring of drinking-water quality and/or sanitary inspections of small-scale water supplies was provided by 44 questionnaires from 40 countries with a population of 723 million, representing 80% of the population of the WHO European Region. This included monitoring mandated by public health offices and requirements for regular self-checking by operators. The question could be answered by ticking a box with the options “yes”, “no” or “only for certain categories of small-scale water supply”.

The requirements reported were diverse (see Table 4). Of the 44 responses, 43% reported that both regular drinking-water monitoring and/or inspections and self-checking by operators were required and 11% reported both requirements only for certain categories of small-scale water supply. Only self-checking by operators was required in 14% of the responses and 5% indicated that neither independent drinking-water monitoring and/or inspection, nor self-checking by operators was required.

Table 2. Surveillance requirements for small-scale water supplies in responding countries

Surveillance requirements in small systems		Number of questionnaires	Proportion (%)
Regular independent drinking-water quality monitoring and/or sanitary inspection	Regular self-checking by operators		
Yes	Yes	19	43
Yes (only for certain categories of small-scale water supply)	Yes (only for certain categories of small-scale water supply)	5	11
Yes	No	6	14
No	Yes	5	11
Yes (only for certain categories of small-scale water supply)	Yes	5	11
Yes	Yes (only for certain categories of small-scale water supply)	2	5
No	No	2	5

Of the responses which indicated that independent surveillance is conducted, 32 provided information on who pays the costs of monitoring and/or sanitary inspection. In 48% of the cases, the authority pays for the costs, in 33% of the cases the operator does, and in 18% both the authority and the operator pay for it.

#### 4. Water quality monitoring in small-scale water supplies

Information on drinking-water quality was provided by 38 questionnaires from 36 countries with a population of 629 million, representing 70% of the population of the WHO European Region.

Since they were required to report on small-scale water supplies to the European Commission in 2012, most EU countries were able to provide information (derived mainly from 2010) about the frequency of analyses, the parameters analysed and the level of compliance with national standards per supply category for public small-scale water supplies serving up to 5000 people. Other non-EU responses provided water quality data using other supply categories. The respondents which provided information on the data source indicated that the information provided was based on national statistical data in 88% of responses and on estimates or expert judgements in 12%.

The information provided shows that, at least at the national level, sufficient data are not typically available to facilitate easy comparison of parameters and compliance in different sizes of water supply throughout the WHO European Region.

Of the 38 questionnaires, 37 indicated either the number of supplies analysed or the number of analyses conducted, or gave information on both. In 8 responses information was provided about the number of each of the three categories of supply (10-100 m<sup>3</sup>/day, >100-400m<sup>3</sup>/day, and >400-1000m<sup>3</sup>/day) and the number of *Escherichia coli* (*E. coli*) analyses. Other analysed parameters were also presented but less consistently, that is why information on sampling frequency is only given for *E. coli*. Of these countries, Austria had the highest number of analysed supplies: 3100 supplying more than 10 m<sup>3</sup> and up to 100 m<sup>3</sup> per day; 1100 supplying over 100 m<sup>3</sup> and up to 400 m<sup>3</sup> per day; and 360 supplying over 100 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day. Malta was the country with the lowest number of supplies, at one, two and four respectively.

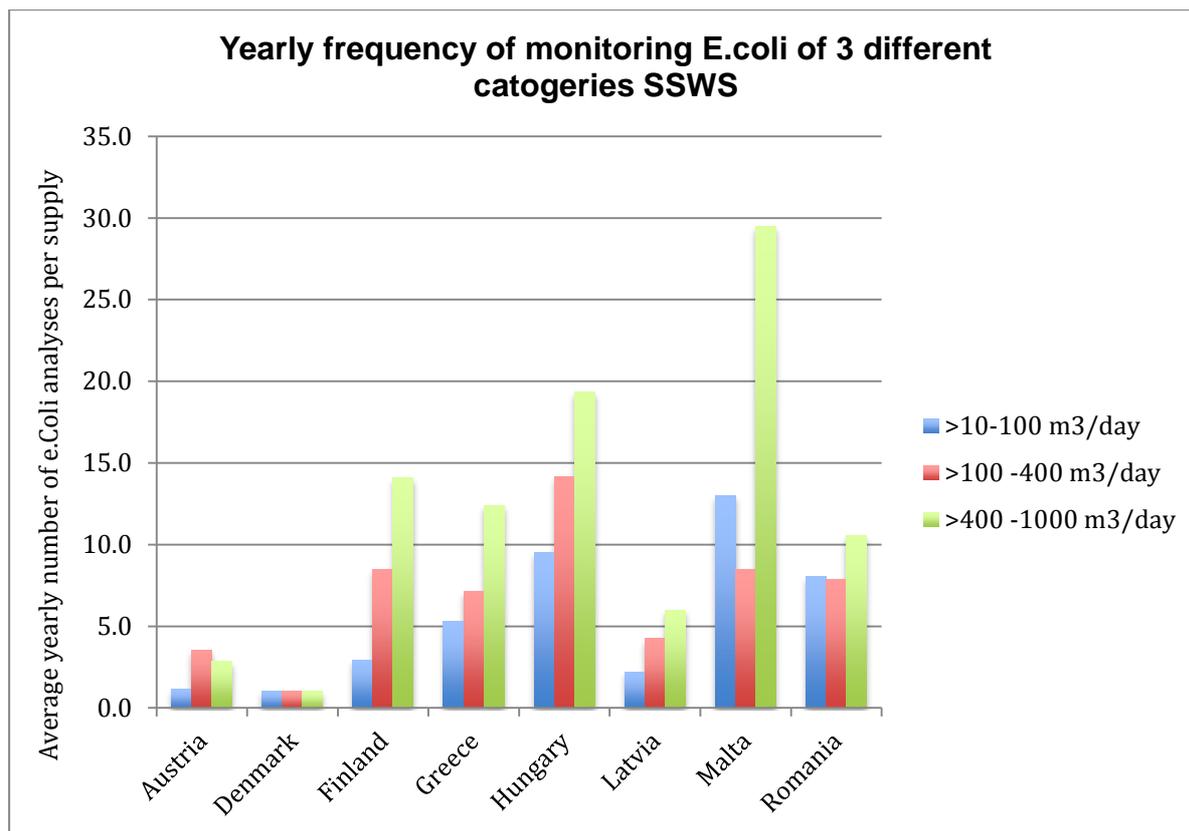
Based on the number of supplies analysed and the number of *E. coli* analyses reported, average annual *E. coli* monitoring was estimated for 8 countries and for three categories of supply.

The frequency of analysis of *E. coli* differed from country to country and for the three categories of supply. Although there were exceptions, it was generally observed that the smaller the size of the supply the fewer analyses were conducted (see Fig. 9).

Fig. 8. Frequency of *E. coli* monitoring in water from three categories of small-scale water supply in responding countries<sup>10</sup>

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<sup>10</sup> In Greece the smallest size category is defined not as >10-100m<sup>3</sup>/day, but as 0-100m<sup>3</sup>/day.



#### 4.1. Water quality of supplies delivering over 10 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day or serving 51–5000 people

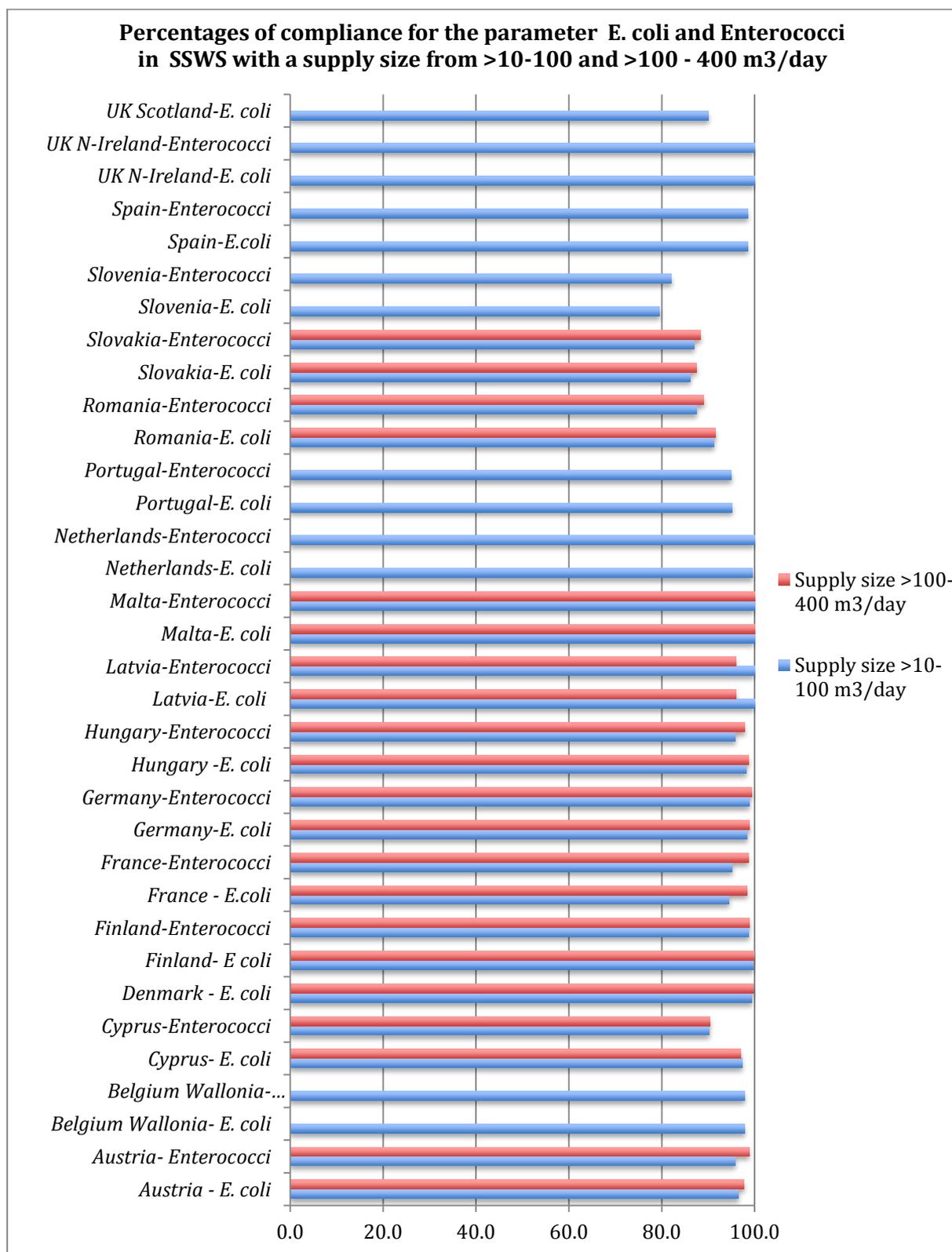
Owing to the different classification and/or definitions of small-scale supplies used in the WHO European Region, the information in this section concerns mainly EU countries presenting information about the water quality of different categories of small-scale water supplies.

As presented in Section 3.1.2 several non-EU countries classify small-scale water supplies as, for example, non-piped (non-centralized), rural or local supplies. Hence, only limited information was available from these countries about the water quality of a particular size of centralized small-scale water supply.

##### 4.1.1. Compliance for microbiological indicators

Information regarding the occurrence of *E. coli* was often combined with information about the occurrence of enterococci, whereupon the levels of compliance for both indicators were mostly more or less the same for the specified size of supply. From the available information of the countries included in figure 10, levels of compliance with national standards for *E. coli* and enterococci are presented as proportions for one or two supply categories: over 10 m<sup>3</sup> and up to 100 m<sup>3</sup>, and over 100 m<sup>3</sup> and up to 400 m<sup>3</sup> per day. Of the 17 countries and regions presented, the level of compliance with national standards for *E. coli* and/or enterococci was less than 90% for the presented supply category in three (17%) questionnaires. In the remaining cases, the level of compliance for *E. coli* and/or enterococci was between 90% and 100% for both supply categories (see Fig. 10).

Fig. 9. Compliance with national standards for *E. coli* and enterococci in responding countries



Because of differing or unknown supply sizes, diverse information received from other countries about the level of microbiological compliance could not be included in Fig. 10 and is therefore summarized in Table 5.

Table 3. Compliance for microbiological parameters in small-scale water supplies serving more than 50 people in responding countries

Country	Number of people served	Parameter	Year	Level of compliance (%)	Number of supplies	Number of analyses
Azerbaijan	501–5000	<i>E. coli</i>	2009	93	2255	2349
			2010	90	2207	2873
Croatia	51–5000	Faecal coliforms	2008	68	443	538
		Total coliforms	2008	40	443	538
Ireland	Private group water schemes <sup>a</sup>	Coliform bacteria	2010	88	484	1768
		Colony count @ 22°C	2010	92	149	176
The former Yugoslav Republic of Macedonia	No information about size of supplies	<i>E. coli</i>	2011–2012	84	No data	433
		Enterococci		95	No data	434
Poland <sup>b</sup>	501–5000	<i>E. coli</i>	2011	100	4063	8126
		Enterococci	2011			
Norway	>50	<i>E. coli</i>	2011	99	1481	44 740
		Enterococci	2011	99	1330	15 367

<sup>a</sup> schemes in which the owners – usually representatives of the local community – source and distribute their own water.

<sup>b</sup> results of the level of compliance of the two parameters are not separately available.

#### 4.1.2. Compliance of chemical parameters in small-scale water supplies

Information on the chemical compliance for small-scale water supplies of the three supply categories over 10 m<sup>3</sup> and up to 100 m<sup>3</sup>, over 100 m<sup>3</sup> and up to 400 m<sup>3</sup> and over 400 m<sup>3</sup> and up to 1 000 m<sup>3</sup> per day (as used for reporting to the EU), or a category within the supply size over 10 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day was received mainly from EU countries. In general, the chemical parameters reported were arsenic, fluoride, iron, nitrate and manganese.

The number and types of parameter and the categories for which they were reported, however, differed significantly between countries and were abundant. As a result, no comprehensive overview of the situation regarding compliance with chemical parameters or comparison of compliance levels in small and larger systems could be drawn from the data provided.

An overview follows of the 25 respondents reporting the level of compliance for chemical parameters with the national standard value for supplies with a size over

10 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day, whereas the results provided of the different categories within a size over 10 m<sup>3</sup> and up to 1000 m<sup>3</sup> per day are summarised. If information was only provided as one category somewhere in the range of 10 m<sup>3</sup> up to 1 000 m<sup>3</sup>, that was considered for this assessment as well. For this overview, however, it should be noted that the number of analysed and reported chemical parameters ranged from 3 to over 100, the number of analysed samples from 1 to over 10 000 and the number of supplies monitored from 1 to more than 4000.

Of the returned questionnaires, 25 provided the level of compliance of chemical parameters for supplies over 10 m<sup>3</sup> and up to 1000 m<sup>3</sup>:

- 6 (24%) reported a level of compliance between 95% and 100% for all analysed parameters in all size categories;
- 5 (20%) reported a level of compliance of less than 95% but more than 90% for one or more chemical parameters in one or more of the size categories, and no level of compliance of less than 90% for any parameter in any size category;
- 14 (56%) reported a level of compliance of less than 90% for one or more chemical parameters in one or more of the size categories.

According to the information provided, chemical parameters with a level of compliance of less than 90% included:

- nitrogen-containing chemicals such as ammonium, nitrate and/or nitrite in Croatia, Denmark, Estonia, Hungary, Latvia, Romania and Slovenia;
- fluoride in Estonia and Slovenia;
- arsenic in Hungary;
- manganese and/or iron in , Croatia, Denmark, Estonia, Hungary, Latvia, Romania, Slovakia and the United Kingdom (Northern Ireland);
- sodium in Malta.

#### 4.2. Compliance for individual, decentralized and local supplies and supplies serving up to 50 people

Information about the quality of individual, decentralized and local supplies and supplies serving up to 50 people was provided by 9 questionnaires returned from eight countries (see Tables 6 and 7) with a population of 163 million, representing 18% of the population of the WHO European Region. The parameters and types of supply presented reflect the information and terms given by the respective countries as far as possible (including translations from Russian to English). Spain reported the highest levels of compliance for *E. coli* and enterococci (98% each); for other countries the levels of compliance for microbiological indicators ranged from 58% to 96%.

Table 4. Compliance for microbiological parameters in supplies serving up to 50 people, non-piped, decentralized and local supplies, public and individual wells and rural utilities in responding countries

Country	Parameter	Type of supply	Number of supplies analysed	Level of compliance (%)
Belarus	Microbiological analysis	Non-centralized supplies	No data	90

Country	Parameter	Type of supply	Number of supplies analysed	Level of compliance (%)
<b>Bosnia and Herzegovina (Republic of Srpska)</b>	Microbiological parameter	Local supplies	1876	73
<b>Ireland</b>	<i>E. coli</i>	Small private supplies	972	95
	Enterococci		467	93
	Coliform bacteria		974	76
<b>Republic of Moldova</b>	Total Coliform	Wells( decentralized supplies)	no info	86
	<i>E. coli</i>			90
	Enterococci			92
	Total Coliform	Child care	no info	96
	<i>E. coli</i>			95
	Enterococci			96
<b>Romania</b>	Coliform bacteria	Public and individual wells	5462	60
	<i>E. coli</i>		6030	69
	Enterococci		5988	65
<b>Portugal</b>	Coliform bacteria	<50 people	1012	90
	<i>E. coli</i>			95
	Enterococci		1011	95
<b>Spain</b>	<i>E. coli</i>	≤50 people	793	98
	Enterococci		295	98
<b>United Kingdom (Northern Ireland)</b>	<i>E. coli</i>	<50 people	56	80
	Enterococci			82
<b>United Kingdom (Scotland)</b>	<i>E. coli</i>	<50 people	1302	78
	Coliform bacteria		1307	58

The information available on the levels of compliance with national standards for chemical parameters in water supplies serving up to 50 people, local, non-piped and decentralized supplies or wells is summarized in Table 7; the parameters are presented as reported by the respective countries.

Table 5. Compliance for chemical parameters in supplies serving up to 50 people, decentralized and local individual supplies and rural utilities in responding countries

Country	Parameter	Type of supply	Number of supplies analysed	Level of compliance (%)
<b>Belarus</b>	Fluoride	Non-centralized water supplies	442	99
	Arsenic		132	96
	Manganese		1588	98
	Iron		2508	95
	Nitrate		18 039	75
<b>Bosnia and Herzegovina (Republic of Srpska)</b>	Physicochemical parameter	Local supplies	1876	95
<b>Ireland</b>	Nitrate	Small private supplies	644	99
	Fluoride		37	100
	Arsenic		113	98
	Iron		701	94
	Manganese		437	87
	Trihalomethanes (total) <sup>a</sup>		11	83
<b>Romania</b>	Nitrate	Public and individual wells	6698	69
	Arsenic		118	87
	Iron		1496	93
	Manganese		647	93
	Ammonium		5195	89
<b>Portugal</b>	Fluoride	<50 people	807	100
	Nitrate		1011	99
	Arsenic		854	97
	Iron		927	92
	Manganese		1012	93
<b>Spain</b>	Fluoride	≤50 people	298	100
	Nitrate		322	96
	Arsenic		294	97
	Iron		453	99
	Manganese		319	99
<b>United</b>	Manganese	<50 people	35	74

Country	Parameter	Type of supply	Number of supplies analysed	Level of compliance (%)
<b>Kingdom (Northern Ireland)</b>	Fluoride			100
	Nitrate			100
	Arsenic			100
	Iron			97
	MCPA (herbicide)			100
	Trihalomethane			100
<b>United Kingdom (Scotland)</b>	Aluminium	<50 people	91	91
	Iron		661	88
	Manganese		640	91
	Lead		1034	93
	Trihalomethane		10	100

<sup>a</sup> With two exceptions, Ireland provided the level of compliance with all chemical parameters of the Drinking-water Directive, Annex 1, Parts B and C.

### 4.3. Requirements for reporting drinking-water quality

On the question of the regular reporting required at the national level on drinking-water quality for small-scale water supplies, information was provided by 45 questionnaires returned from 41 countries with a total population of 728 million, representing 81% of the population of the WHO European Region.

Of these, 35 questionnaires from 32 countries indicated that regular reporting was required for small-scale water supplies and 10 questionnaires from 10 countries indicated that there was no obligation to report the drinking-water quality of small-scale water supplies. One country answered in free text that reporting is practised at the communal level (among clusters of villages with common administration), and another answered that mechanisms for reporting were established but that the data were not made public.

Several responses mentioned that they fulfilled the reporting obligations of the EU Drinking-water Directive. According to the Directive, these reports “shall include, as a minimum, all individual supplies of water exceeding 1000 m<sup>3</sup> a day as an average or serving more than 5000 people”, and “each Member State shall publish a report every three years on the quality of water intended for human consumption with the objective of informing consumers”. The EU also required additional reports in 2010 and 2012 on small-scale water supplies serving more than 500 people.

### 4.4. Data on outbreaks specifically related to small-scale supplies

On the question of whether epidemiological data indicating outbreaks specifically related to small-scale water-supplies exist, information was provided by 43 questionnaires returned from 39 countries with a total population of 719 million, representing 80% of the population of the WHO European Region.

Of these, 23 responses (53%) from 22 countries indicated that epidemiological data exist on outbreaks of water-related diseases specifically related to small-scale water supplies, while 20 responses (47%) from 19 countries indicated that no such information exists.

In general, only limited information was provided about the numbers and types of water-related disease outbreaks registered (or reported) in small-scale water supply areas. Free text information was provided in 28 responses from 27 countries, of which six of those that epidemiological data related to small-scale water supplies also indicated that the epidemiological data are collected by national health institutions.

## 5. Summary and conclusions

The assessment covered 43 of the 53 countries in the WHO European Region, covering 736 million people or 82% of the total population of the Region (902 million).

Despite the high response rate, in several responses the requested information was provided only partly or insufficiently for the purpose of the assessment. Only the questions concerning legal and regulatory requirements for drinking-water supplies and institutional responsibilities for regulating water supply were answered sufficiently for assessment in all responses. This is a reflection of the often limited availability or reliability of data at the national level, which particularly depend on adequate registration and monitoring for small-scale water supplies. In particular, information about private supplies or supplies serving up to 50 people, drinking-water quality and epidemiological data was often not available.

Two main approaches are used in defining small-scale water supplies in the WHO European Region. The majority of countries of the former Soviet Union differentiate between piped and non-piped, centralized and decentralized or local and urban supplies. In general, supplies are defined according to the type of management. EU countries, on the other hand, base their definition of small-scale water supplies on the amount of water supplied or the number of people served.

Small-scale systems, including individual supplies, are an important pillar of the water supplies in the WHO European Region: approximately 23% of the population of the Region receive their water from such systems. Table 8 summarizes the data provided by the questionnaire responses and extrapolates the available information to a regional estimate assuming that estimates were comparable to the rest of the Region.

Table 6. Population served by small-scale water supplies

Category	Proportion served according to questionnaire responses received (%)	Numbers of population if extrapolated to entire Region (millions) <sup>11</sup>
Population served by individual and non-piped supplies or supplies serving ≤50 people (≤10 m <sup>3</sup> /day)	7	63
Population served by supplies serving 51–5000 people (>10–1000 m <sup>3</sup> /day)	16	144
Total	23	207

In the majority of countries, legislation and regulations on drinking-water in place typically also apply to small-scale public water supplies, as indicated by 87% of the questionnaires returned. With respect to individual water supplies, however, this was only the case in 36% of the responses, and partly only for those supplies with commercial activity.

In 19% of the responses, responsibility for regulating water supply lies with a single institution. Particularly in such cases, coordination with other sectors is crucial in order to ensure consideration of prevailing issues relevant to safe management of small-scale water supplies, such as sanitation or agriculture. The national legislation and regulations should consider small-scale water supplies and allow for addressing their particularities. This might include, for example, specific provisions for individual supplies, monitoring and surveillance requirements and/or operator qualification requirements.

Of the responses, 5% indicated that for small-scale water supplies neither independent surveillance nor self-checking of the drinking-water quality and sanitary conditions of the supplies was required; 11% indicated that only self-checking by the operators was required. This indicates that in many countries only limited information is available to the responsible authorities on the supplies for which no such legal obligation exists. Establishing risk-based surveillance approaches may improve the evidence base, and advancing safe management approaches for small-scale systems is particularly beneficial in situations where only limited surveillance is conducted by the authorities.

No minimum qualifications or competences are required for operators of small public supplies according to 48% of the responses. This supports the theory that small-scale systems are often operated by non-professionals who may require external support and guidance on how to operate the systems safely.

Many questionnaires contained only incomplete or no information about the level of compliance with national standards for drinking-water quality of small-scale water

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<sup>11</sup> Information was received in the survey from countries covering 82% of the population of the Region. Extrapolation was calculated under the assumption that the same percentage as shown in the table was applicable to the entire population of the Region.

supplies. This likely indicates that, in many rural regions – in particular, those with supplies serving up to 50 people or local, rural or non-piped supplies – monitoring activities and/or possibilities are apparently very limited (of the 47 returned questionnaires only 9 provided information about the water quality). Consequently, at least at the national level, insufficient data are typically available to facilitate systematic analysis of the water quality situation in small-scale systems, including compliance trends over time. Routine and systematic data collection for different supply sizes and types would improve the evidence base and support prioritizing of improvement interventions – for example, focusing attention on the supply types showing the highest levels of noncompliance.

Limited information is also available on epidemiological data related to small-scale water supplies.

According to the results of this assessment, an estimated number of approximately 200 million people in the WHO European Region are served by small-scale water supplies (Table 8). This is a significant proportion of the population of the Region which should enjoy the same right to access to safe water services as those receiving drinking-water from large(r) supplies.

This survey reveals that information on small-scale water supplies that would allow a systematic assessment of the conditions and possible health impacts is typically not readily available at the national level across the Region. Where not yet existing, establishing a national register of small-scale water supplies of different types and sizes could be a first step to improving the evidence base. Conducting nationally representative rapid assessments of drinking-water quality for small-scale water supplies has proven to be an important step to identify systematically sanitary risk factors and water quality parameters of common concern, and thereby allowing the formulation of targeted intervention strategies and programs to improve the situation.

Systematic assessments also support the baseline analysis and target setting process under the Protocol on Water and Health. Based on the outcomes of the national evaluation, targets aiming to improve the situation of small-scale water supplies may for example consider, but are not limited to,

- issuing or updating enforceable legislation and regulations to specifically address small-scale water supplies;
- specifying educational, training or certification requirements for operators of small-scale water supplies, and providing external support and guidance to them;
- introducing a risk-based approach in surveillance of small-scale water supplies by national authorities to allow for resource effective water quality monitoring and inspection activities reflecting prevailing priorities; and
- promoting safe management of small-scale water supplies, including establishing the WHO-recommended water safety plan approach.

Detailed information on how such action can be taken, as well as examples of how countries from the Region have taken measures towards improving small-scale systems, can be found in the publication “Taking policy action to improve small-scale water supply and sanitation systems. Collection of tools and good practices from the WHO European Region”.

# **Appendix 1**

**Questionnaire as distributed  
in June 2012**