

## Indicator Fact Sheet

### (WEU10) Drinking Water Quality

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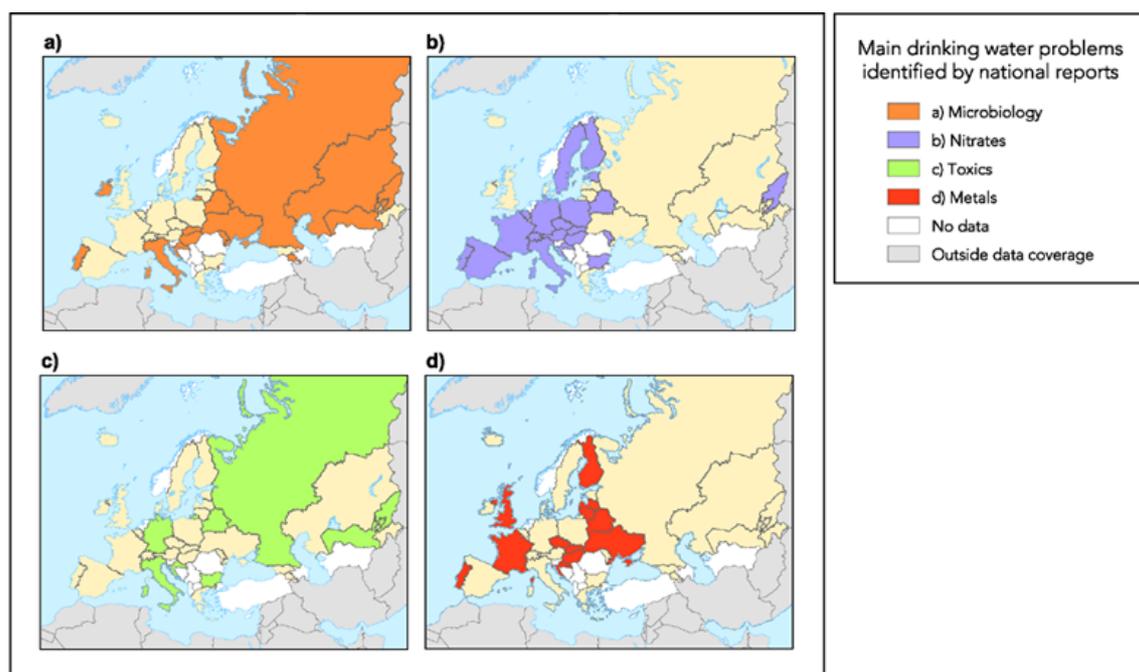
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#### Key messages

- Nitrate in drinking water is a common problem across Europe particularly from small supplies/wells in contaminated shallow groundwater.
- Pesticide and metal contamination of drinking water supplies has been identified as a problem in many European countries

**Figure 1: Main Drinking Water Problems identified by national reports**



Notes: Year of reported problem is not the same for each country: range of reported years, mid-1990s to 2001. Yellow countries have not reported the particular problem. A country was included if it was reported that there was a national problem with a particular contaminant and/or there were problems in particular areas or situations. For example, Estonia: nitrates arising from areas of intensive agricultural land use; and, Finland: nitrate problems in some private wells or boreholes used for water supply.

Sources: compiled by ETC/WTR from National State of Environment Reports, national OECD Environmental Performance Reviews, Global Water Partnership

#### Results and assessment

##### Policy relevance and context:

The Drinking Water Directive (80/778/EEC) and its revision (98/83/EC which came into force in 2003) aim to ensure that water intended for human consumption is safe. It must be free of any microorganism, parasite or substance that could potentially endanger human health. The

directive sets minimum requirements for certain parameters. Member States must set standards for these parameters that are no less stringent than in the directive and then monitor the quality of drinking water against those standards.

For countries outside the EU the World Health Organisation has as one its priorities that "all people, whatever their stage of development and their social and economic conditions, have the right to have access to an adequate supply of safe drinking water". To help achieve this they publish 'Guidelines on Drinking Water Quality' (now its 3<sup>rd</sup> edition) which countries should meet to ensure the health of their population.

Monitoring of drinking water quality varies across the EU, candidate countries and New Independent States (NIS) with some countries monitoring the water at the point of consumption i.e. at the tap, and others monitoring at source or as the water leaves the distribution works. There is also a lot of variation in the parameters monitored, the techniques used and the number of samples taken across different countries. This makes comparisons of data difficult. This indicator therefore gives a general overview of the main problems in each country by categories of parameters.

#### Environmental context:

Drinking water quality is of direct relevance to human health and also reflects the levels of contaminants in the raw water (surface water and groundwater), and the efficiency of water treatment and water distribution systems.

#### Assessment:

In the EU15 countries nitrate contamination is a problem commonly identified in many national reports. This is likely to be due to intensive agriculture and the use of artificial fertilisers which contaminate raw water sources. Nitrate contamination is often a particular problem in small wells e.g. in Belgium 29% of 5000 wells examined had nitrate levels in excess of 50mg/l nitrate (OECD EPR Belgium, 1997). Excess nitrogen in drinking water is of particular concern for babies where it is known to cause methemoglobinemia, or "blue baby" syndrome. It is also often a particular problem in rural water supplies, which are not necessarily reported or well monitored since they often only serve small populations and are not covered by the drinking water directive. However, nitrate contamination should be reduced with the implementation of the Nitrates Directive ((91/676/EEC).

In the Central and Eastern European countries (CEEC) problems with microbiology (e.g. in Slovakia and Hungary) and nitrates (e.g. in Estonia) were also reported. However, the most common problem across the CEEC was metal contamination. For example, the Czech Republic has problems with barium, nickel and selenium (OECD EPR Czech Republic, 1999) and in Lithuania 55% of samples from centralised sources have excess iron (CEETAC, 2000). Problems with iron and manganese are common in Central and Eastern European countries due to lack of efficient technologies installed for removal of these contaminants which often occur naturally in groundwater. In addition, Slovakia and Hungary had high exceedences for the toxic parameter arsenic. The sources of arsenic in drinking water are from the water flowing through arsenic rich rocks and also from industrial contamination. Long-term exposure to arsenic contamination causes various skin diseases and also cancer of the skin, lungs, urinary bladder and kidneys (WHO, 2001).

The main problem in the Newly Independent States is microbiological contamination of drinking water due to decaying infrastructure e.g. water treatment works that are no longer functioning properly and the prohibitive cost of chlorine which is needed to treat the water. For example in Armenia, 90% of pipes are more than 10 years old and 60% are more than 20 years old (SoE, Armenia, 1998). Contamination from toxics and nitrates was also evident from national reports.

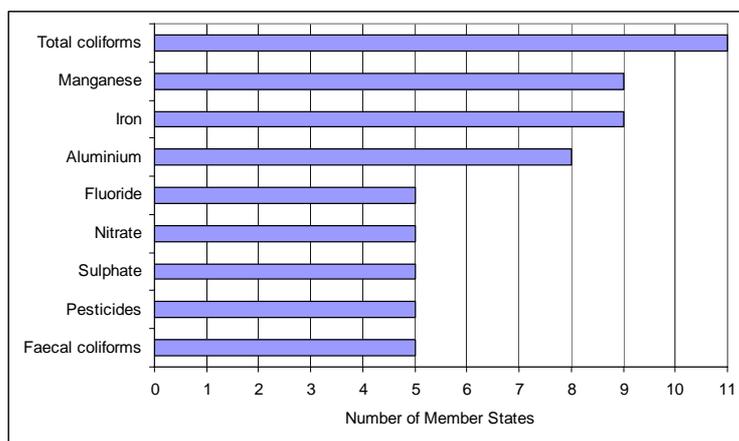
## Sub-indicator

### Most common drinking water quality problems in EU countries

#### Key message

- Microbiological parameters and heavy metals were the most common cause of failure of drinking water standards in EU countries between 1996 and 1998 with Italy and France having the most failing parameters.

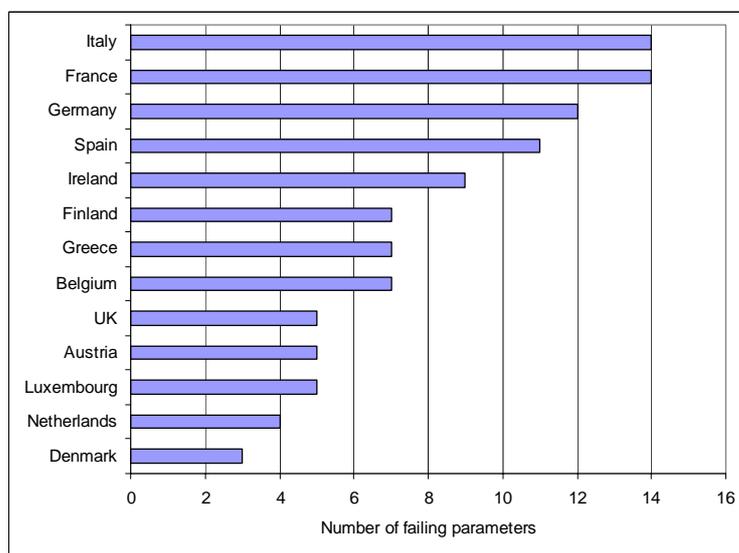
**Figure 2 Overview of main parameters failing drinking water standards in 1996 to**



**1998 (in supplies serving 5000 or more consumers)**

Note: No data reported by Sweden and Portugal  
Source: DGEnv

**Figure 3 Number of parameters failing drinking water standards in Member States in 1996 to 1998 (in supplies serving 5000 or more consumers)**



Note: No data reported by Sweden and Portugal  
Source: DGEnv

#### Assessment of sub-indicator

Total coliforms followed by manganese, iron and aluminium were the most common parameters failing Drinking Water Directive standards in EU countries between 1996 and 1998 (Figure 2). Nitrate, pesticides, fluoride and sulphate were also problems (in terms of failing standards) nationally and at the individual supply level in 5 countries. Italy and France reported the most

parameters (14) failing drinking water standards between 1996 and 1998, and the Netherlands (4) and Denmark (3 in 1997 only) the least (Figure 4).

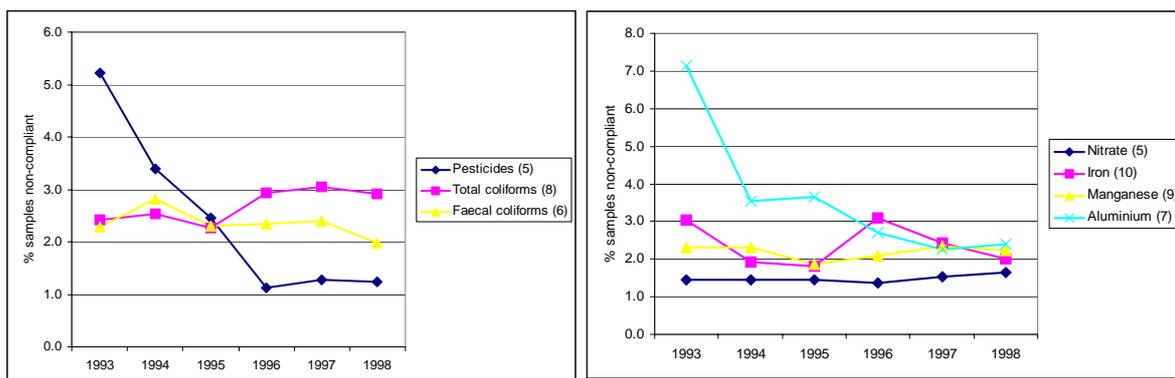
### Sub-indicator

#### Trends in drinking water quality in EU countries, 1993 to 1998

##### Key message

☺ There was a clear trend of improving drinking water quality in terms of pesticides and aluminium in some EU countries between 1993 and 1998.

**Figure 4 Trends in the annual average number of samples not complying with drinking water standards in EU countries, 1993 to 1998**



Notes: Statistical significance of trend not tested. Number of countries on which the trends are based is given in brackets. The remaining countries either did not report, or had full compliance with the standards.

Pesticides: BE, DE, FR, NL, UK

Total coliforms: BE, ES, FR, GR, I, IRL, LU, UK

Faecal coliforms: BE, FR, GR, I, IRL, LU

Nitrate: BE, DE, ES, FR, I

Iron: BE, DE, ES, FR, GR, I, IRL, LU, NL, UK

Manganese: BE, DE, ES, FR, I, IRL, LU, NL, UK

Aluminium: BE, ES, FR, GR, I, IRL, LU

Source DGENV

### Assessment of sub-indicator

Of the most commonly failing Drinking Water Directive parameters, pesticides and aluminium showed a declining trend in the annual average number of samples not complying with standards. For pesticides non-complying samples fell from 5 % to 1 % between 1993 and 1998, reflecting an improvement of water treatment. The other parameters for which there are time series information showed no clear trends with between 1 % and 3 % of samples typically failing per year. Though a relatively small percentage of samples exceeded standards, there is no information on the proportion of the population was exposed to the exceedences nor on the level or duration of the exceedences. The significance of the exceedences in terms of human health cannot therefore be assessed.

### Sub-indicator

#### Most common drinking water quality problems in EU candidate countries and NIS

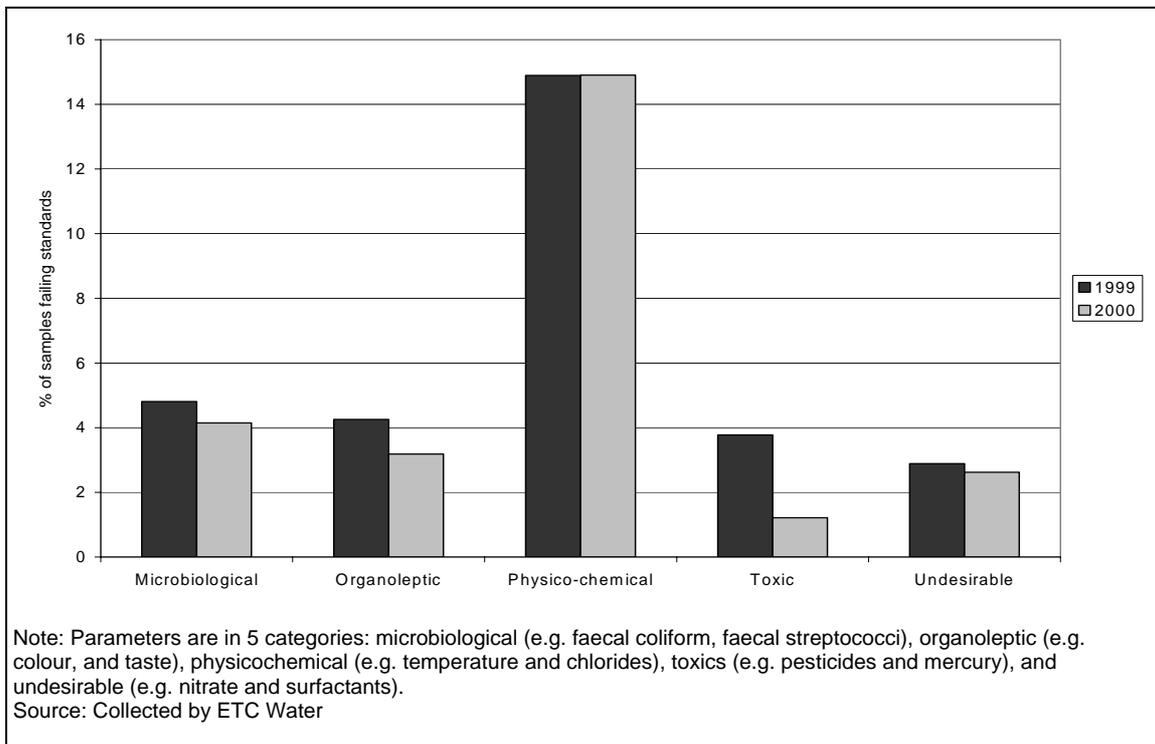
##### Key messages

- Candidate Countries and South East European countries: Physico-chemical parameters are most commonly failed in these countries and this is often due to contamination from metal salts (Figure 5). The percentage of samples failing in other categories implies significant exposure of populations to contaminants but the data are not available to calculate the proportion of the population affected.
- Newly Independent States: Drinking water quality in the NIS is of major concern (Figure 6). All of the NIS for which information was available (8 of 12) have major problems with microbiological contamination of their drinking water supplies much higher than in EU

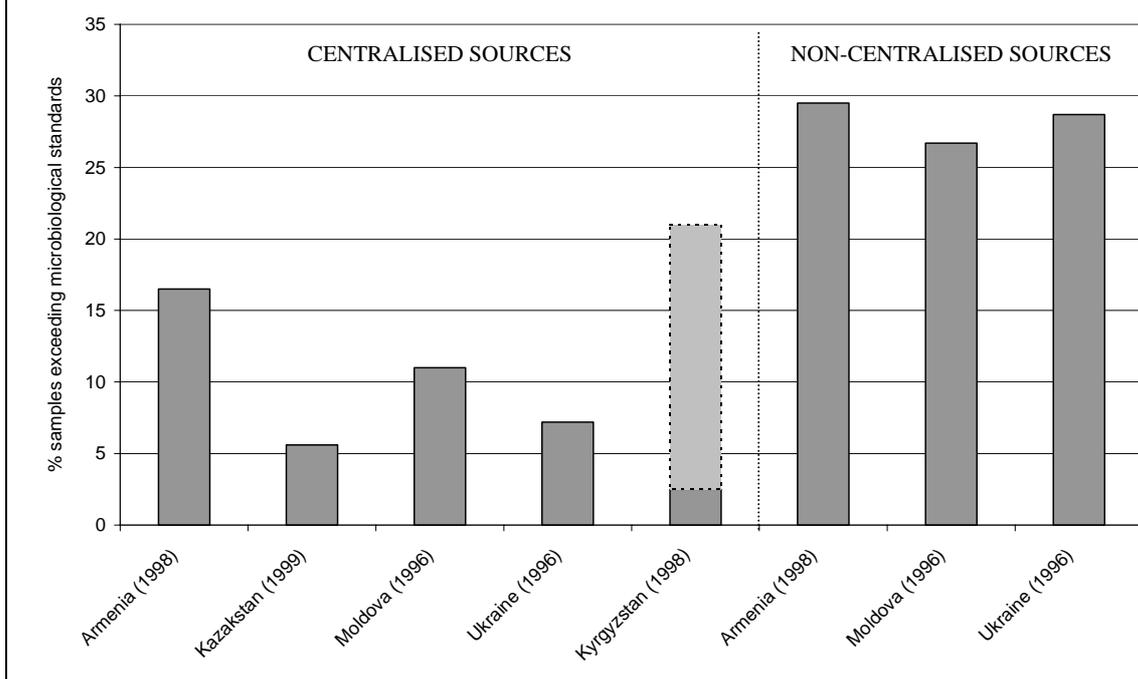
countries (see Figure 4). They suffer from aging infrastructure and from the prohibitive cost of chlorine. These countries also have problems with contamination from toxics and metals and there were also some reports of nitrate pollution.

- In many of the Newly Independent States a significant percentage of the population do not have access to improved drinking water sources and so are likely to be exposed to contaminants. This is also the case for some the Central and South eastern European countries.

**Figure 5: Percentage of samples exceeding standards in the Candidate countries and South Eastern European countries (Hungary, Latvia, Slovak Republic, Czech Republic and Croatia)**



**Figure 6: Samples exceeding microbiological parameters in the Newly Independent States**



Note: Data for Kyrgyzstan shows the range of percentage exceedances as only regional data that could not be aggregated was available.

Source: UNECEPR's

### Assessment of sub-indicators

**Central and Eastern Europe:** About 4% of samples failed microbiological standards in 2000 (Figure 5) with Slovakia having the highest exceedances of total coliforms and faecal coliforms. These parameters are considered to be indicative of faecal contamination, which can lead to the spread of waterborne disease. Also about 15% of samples did not meet physico-chemical parameters (figure 3) mainly due to conductivity failures and contamination from magnesium, aluminium, chlorides and sulphates.

**Newly Independent States:** The percentage of samples exceeding microbiological standards in the NIS is between about 5 and 30% (figure 4). Exceedances are higher in non-centralised sources. At least 50% of the population of the Russian federation is thought to be at risk from unclean water (OECD EPR Russia, 2000).

### Sources

DG Environment: Synthesis report on the quality of drinking water in the Member States of the European Union in the period 1996 to 1998.

OECD Environmental Performance Reviews

UNECE – Performance Reviews

WHO (2001) Fact Sheet No 210, Arsenic in Drinking Water

Global Water Partnership (2000) Water for the 21<sup>st</sup> century: Vision to action, Central and Eastern Europe. Edited by the Central and Eastern Europe Regional Technical Advisory Committee of the Global Water Partnership. <http://www.gwpcee.com/index.php?page=4>

### Spreadsheet files:

WEU10\_Non\_compliance.xls

WEU10\_Failing\_para.xls

WEU10\_CCE countries.xls

WEU10\_NIS countries.xls

### Other files:

WEU10\_h2o\_drink2\_100dpi.bmp

### Meta data

#### Web presentation information

1. Abstract / description / teaser:

Describes drinking water quality in Europe, trends and extent of conformity to standards. Defines most common problems: microorganisms, pesticides, nitrate, chemicals and metal contamination.

2. Policy issue / question:

What are the main problems in drinking water quality? Are we meeting the standards of the Drinking Water Directive?

3. EEA dissemination themes:

Water

4. DPSIR:

S

#### Technical information

5. Data source: National Reports (SoE, OECD and UN EPRs). European Commission DGEnv. Member States returns required under the Reporting Directive. Data collected through questionnaire by ETC-Water

6. Description of data: Textural descriptions from National Reports. Responses to standardised questionnaires from DGENv and data collected by ETC-Water. The information is available at a more dis-aggregated level. For example the returns can be broken down by Country, by parameter and by the number of samples exceeding their MACs.
7. Geographical coverage: There are national reports for most EEA countries and NIS. Data from DGENv is only for 9 EU15 countries (12 were supposed to report the information in 1993 to 1995). Data collected by ETC-Water is for 5 Central and Eastern European countries but some information is missing.
8. Temporal coverage: National Reports often for 1 year only. From 1993 to 1995 for EU15, 1997 to 2001 for CEE countries.
9. Methodology and frequency of data collection. DGENv collects information from Member States every 3 years. More recent data from EU15 has not been made available.
10. Methodology of data manipulation. Main drinking water problems were from textural descriptions in National Reports. Also some data e.g. % microbiological exceedences for the NIS are from the UNECEPRs. DGENv returns for 1996-98 were aggregated from paper report. Future data manipulation should be possible electronically (database). CEE countries supplied data electronically.

#### Qualitative information

11. Strength and weakness (at data level). Lack of actual data and so main indicator was based on textural descriptions from National Reports and so is only general. For the DGENv data, only 9 of the EU15 countries responded for the first reporting period and only 5 CEE countries to the recent request. All of a country's population is not necessarily covered by the returns (e.g. small rural supplies). Also exceedence of MACs is only a crude indication of exposure. For the EU15 1993 to 1998 returns there was no information on the **level** or **duration** of exceedences and this was also mainly the case for the CEE country returns. Hence an assessment of the **significance** of the exposure could not be made. However the indicator gives a good general impression of the problems in drinking water supplies.
12. Reliability, accuracy, robustness, uncertainty (at data level). As stated above the data were limited because of inability to assess significance of exposure to populations. However this should improve during subsequent reporting periods. There is also often ambiguity in the returns, which can lead to uncertainty.
13. Overall scoring (give 1 to 3 points: 1=no major problems, 3=major reservations):  
Relevancy: 1  
Accuracy: 2  
Comparability over time: 2  
Comparability over space: 2

#### **Further work required**

Information exchange could be improved using electronic templates. More precise questions to countries would also obtain more relevant information. The candidate countries will have to provide the Commission with information on their drinking water quality once they join the EU in May 2004.