C-9: Drinking water quality

1) General description

1.1) Brief definition

This indicator presents samples exceeding national drinking water quality standards out of the total number of drinking water samples obtained from different sources (water supply industry, open reservoirs, groundwater). At the same time the indicator shows sources of drinking water the population is using – by numbers of the population and as a percentage of the countries' total population.

1.2) Units of measurement

The shares of drinking water samples that do not meet established standards of quality are expressed as a percentage, the population connected to different sources of drinking water are expressed in millions of people.

1.3) Context

Relation to other indicators from the Guidelines - This indicator relates to indicators "C-5: Water supply industry and population connected to water supply industry"

2) Relevance for environmental policy

2.1) Purpose

The indicator provides a measure of the risk of negative impacts of poor drinking water quality on human health and shows the extent to which the drinking water supply conforms to national sanitary requirements and standards.

2.2) Issue

Public health cannot advance without access to an adequate supply of clean drinking water. The quality of drinking water is still an area of concern throughout countries of South-Eastern and Eastern Europe, Caucasus and Central Asia, with significant microbiological contamination of supplies with the proportion of samples exceeding the faecal

contamination standards ranging from 5% to 30% (according to the data by the World Health Organization (WHO)). The indicator is a measure of the extent to which drinking water is contaminated by chemical contaminants and microbiological organisms, and thus it can serve as a mechanism for warning of situations that require further in-depth investigation and actions necessary for the improvement of drinking water quality.

2.3) International agreements and targets

a) Global level

The Guidelines for drinking-water quality, fourth edition, World Health Organization 2011, provide recommendations for managing the risk from hazards that may impair the safety of drinking-water. The document includes guideline values for chemicals that are of health significance in drinking-water.

b) Regional level

The Protocol on Water and Health to the ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes requires that the Parties take all appropriate measures to ensure the adequate supply of healthy drinking water. These include:

- Adequate supplies of wholesome drinking water;
- Adequate sanitation of a standard that sufficiently protects human health and the environment; and
- Effective protection of water resources used as sources of drinking water.

c) Subregional level

The Environmental Strategy of countries of South-Eastern and Eastern Europe, Caucasus and Central Asia, adopted by the 2003 Ministerial Conference "Environment for Europe" stipulates the preparation of programmes to ensure access to adequate drinking water and sanitation services in line with the Millennium Development Goals and the World Summit on Sustainable Development (WSSD) Plan of Implementation.

In the European Union, requirements related to the quality of drinking water are laid down by the Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption (Drinking Water Directive).

3) Methodology and guidelines

3.1) Data collection and calculations

The indicator is estimated from the available samples on the compliance of drinking water with national drinking water standards. The microbiological quality of the drinking water should be expressed in terms of *E. coli* and *Enterococci* levels. Countries may report other microbiological quality criteria, particularly incidence of *Pseudomonas aeruginosa.* A "core group" of 10 chemical quality parameters can be selected. The list of chemical parameters of the EU Drinking Water Directive (98/83/EC), Annex I, Part B can serve as a reference. Turbidity could be included in the chemical parameters.
For each parameter the number of drinking water samples analysed that fail to comply with the relevant standards should be provided. The data should be collected for a total number of regulatory analyses made by an official monitoring agency or undertaker over one year and the number of samples exceeding the standards found in the spatial unit. The share of samples with exceeded national standards can be calculated using the formula:

% of samples with exceeded national standards =
(Number of samples with exceeded standards / Total number of samples taken)

The number of sampling points in the system of centralized and decentralized drinking water supply along with the number of samples taken should provide statistical authenticity regarding the number of samples exceeding the standards. Some countries might not have the necessary calculation capacity to provide national weighted data. In that case the reporting could be started as a non-weighted system, listing the performance in individual sources of drinking water.
Data on the number of population connected to the water supply industry, i.e. public or private bodies whose main functions are water collection, treatment and distribution activities for domestic and industrial needs, can be obtained from operators of the water supply industry. Data on the population using water should be estimated based on numbers from the water supply industry and from national public authorities.

3.2) Internationally agreed methodologies and standards

WHO Guidelines for Drinking-water Quality (4th ed.); The EU Drinking Water Directive (98/83/EC) sets standards for the 48 most common parameters, based on WHO guidelines; Guidelines on the setting of targets, evaluation of progress and reporting under the Protocol on Water and Health, ECE 2010.

4) Data sources and reporting

In countries of South-Eastern and Eastern Europe, Caucasus and Central Asia sanitary and epidemiological inspection authorities have long maintained departmental databases on drinking water quality. Some countries publish data on drinking water quality in annual environmental reports and/or reports on the epidemiological situation.

5) References at the international level

- Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption
- Consultation on target setting and progress monitoring of water and wastewater services, Copenhagen, 9–10 May 2005, (WHO)
- Environmental Indicator Report 2012, EEA 2012
- European Commission – Water Policy: http://ec.europa.eu/environment/water/index_en.htm
- European Environment Agency (EEA): http://www.eea.europa.eu/themes/water
- Europe´s Environment, The Fourth Assessment, EEA 2007
- Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators
- Global analysis and assessment of sanitation and drinking-water (GLAAS), WHO 2012: http://www.who.int/water_sanitation_health/publications/glaas_report_2012/en/index.html
- Global water information system of the Food and Agriculture Organization (AQUASTAT): http://www.fao.org/ag/agl/aglw/aquastat/water_res/waterres_tab.htm
- International Recommendations for Water Statistics (IRWS): http://unstats.un.org/unsd/envaccounting/irws/irwswebversion.pdf
- The Protocol on Water and Health: Guidelines on the Setting of Targets, Evaluation of Progress and Reporting, ECE/WHO 2010: http://www.unece.org/index.php?id=11644 (C9)
- Protocol on Water and Health to the ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: http://www.unece.org/fileadmin/DAM/env/documents/2000/wat/mp.wat.2000.1.e.pdf
- The European Environment: State and Outlook 2010: Synthesis, EEA 2010
- United Nations Statistics Division (UNSD): http://unstats.un.org/unsd/environment/

- United Nations Statistics Division (UNSD)/United Nations Environment Programme (UNEP) Questionnaire on Environment Statistics (2013): http://unstats.un.org/unsd/environment/questionnaire2013.html

- World Health Organization (WHO): http://www.euro.who.int/en/home

- World Health Organizations (WHO) Guidelines for Drinking-water Quality, 4th edition (WHO, 2011): http://www.who.int/water_sanitation_health/publications/2011/dwq_guidelines/en/index.html

- World Meteorological Organization (WMO): www.wmo.ch.