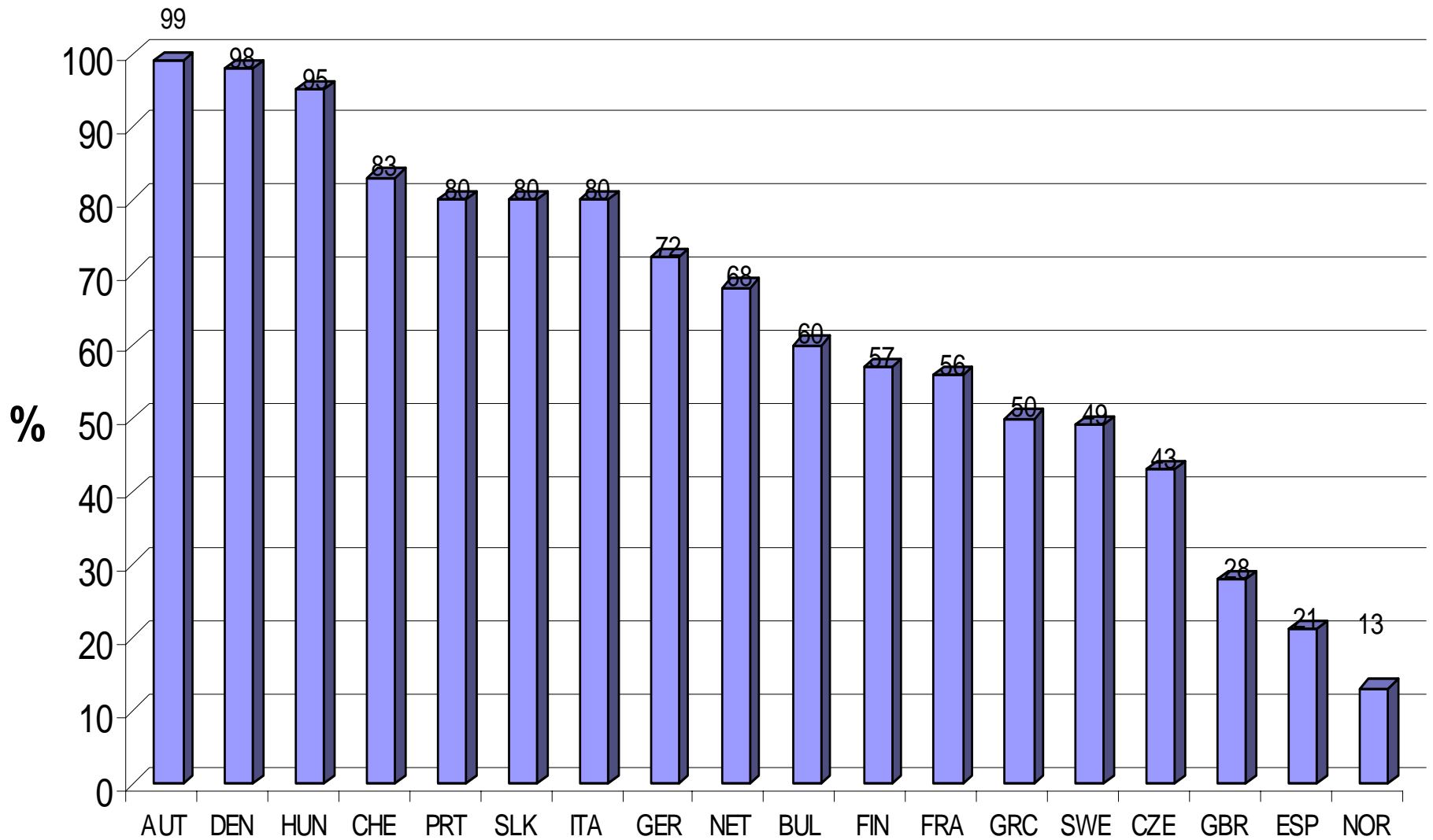


GROUNDWATER MANAGEMENT AND HEALTH

R Aertgeerts

Regional Adviser, Water and Sanitation
watsan@ecr.euro.who.int

Proportion of groundwater in drinking-water supplies

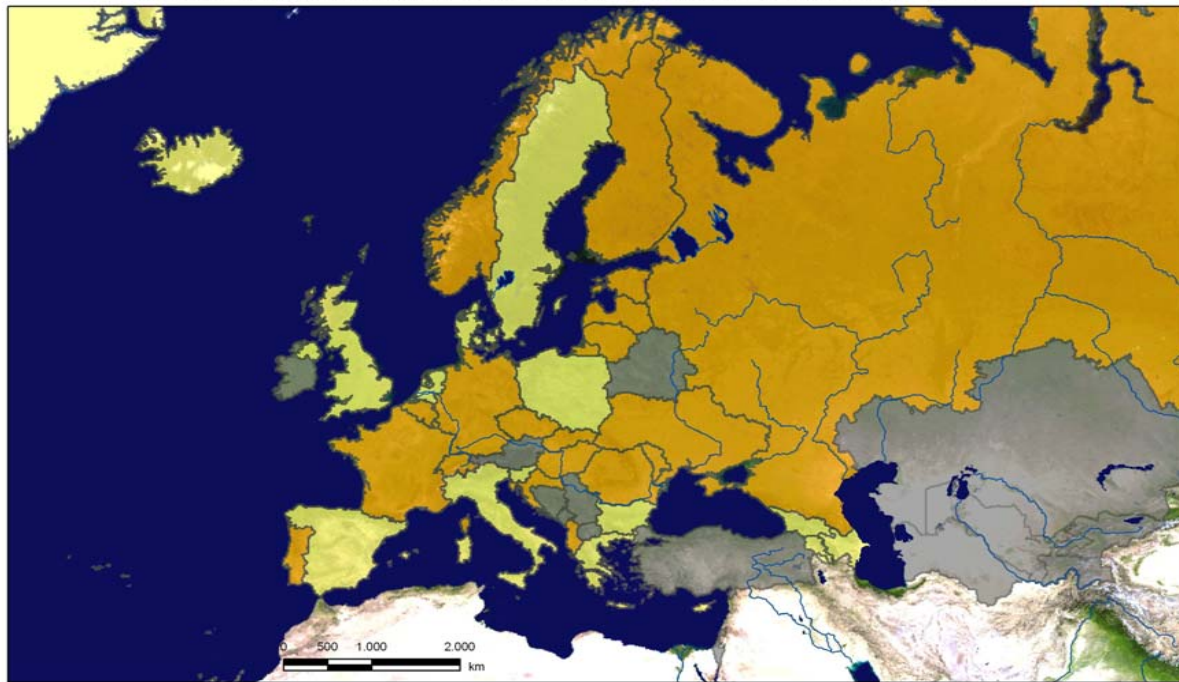


Pathogenic micro-organisms in groundwater

Organism	Associated health effects
Norovirus	Gastroenteritis
Hepatitis A	Fever, nausea, jaundice, liver fail
<i>E. Coli</i>	GI, HUS
<i>Shigella spp</i>	GI, dysentery, reactive arthritis
<i>Campylobacter jejuni</i>	GI, Guillin-Barre syndrome
<i>Legionella spp</i>	Legionnaire's disease, Pontiac fever
<i>V. Cholerae</i>	Cholera
<i>Cryptosporidium parvum</i>	Diarrhoea
<i>Giardia lamblia</i>	Chronic diarrhoea

Protocol on water and health

Status of Ratification of the Protocol on Water and Health - 2007



Data Source: UNECE, December 2007; ESRI 2004 & 2006
 Cartography: WHOCC for Health Promoting Water Management
 and Risk Communication, Bonn 2007
 Update: 10 December 2007

Status of Protocol on Water and Health

- Ratified
- Signed
- Abstained
- Country Borders
- Major Waterbodies
- Major Rivers

Disclaimer: The designations employed and the presentation of this material do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Art (5) j

Water resources should, as far as possible, be managed in an integrated manner on the basis of catchment areas, with the aims of linking social and economic development to the protection of natural ecosystems and of relating water-resource management to regulatory measures concerning other environmental mediums. Such an integrated approach should apply across the whole of the catchment area, whether transboundary or not, including its associated coastal waters, the whole of a groundwater aquifer or the relevant parts of such a catchment area or groundwater aquifer

Art 6 (2) i- j

- Art 6(2)i *The quality of waters which are used as sources for drinking-water*
- Art 6(2)j *The identification and remediation of particularly contaminated sites which adversely affect waters within the scope of the Protocol, or are likely to do so, and which thus threaten to give rise to water-related disease*

Art 6(5)b

- Art 6(5)b states that In order to promote the achievement of the targets, the Parties shall each develop water-management plans in transboundary, national and/or legal contexts, preferably on the basis of catchment areas or groundwater aquifers. In doing so, they shall make appropriate practical and/or other provisions for public participation, within a transparent and fair framework, and shall ensure that due account is taken of the outcome of public participation

EU acquis communautaire

- Water framework directive
 - River basin management plans
- Groundwater directive
 - Chemical quality
 - Microbial quality
- EU network on epidemiological surveillance

Climate change

- Temperature increase by about 4 C
- Decrease in precipitation by 24%
- Increase in water scarcity population from 170 million to 292 million in 2050
- Increase in tourism population but shift in seasons.
- Increased saline intrusion

Groundwater recharge

- *The downward flow of water reaching the water table and replenishing groundwater resources.*
- *Climate change?*

Questions

- How can contamination in aquifers be assessed and how can targets for improvement be realistically defined?
- How can karst aquifers be integrated in IWRM plans esp. transboundary?
- How can small, not regulated users be included?
- How can aquifers be better protected in the context of water safety plans?
- How can point sources from contaminated sites be ranked?
- How can aquifer management be adapted to climate change?

WHO Framework for safe drinking-water

- Health-based targets based on evaluation of health concerns
- Water safety plans that include
 - System assessment
 - Operational monitoring
 - Management plans
- System of independent surveillance