



Drinking Water Quality in Hungary

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A Glance into History

1930' - waterborne outbreaks (typhoid, dysentery)
ample exploitation of confined deep wells

1950' – extension of municipal water supply in the countryside

- 23 big state waterworks operate all supply

- Public Health Stations of complete coverage established

- cheap (free) drinking water for (almost) all

1980' – arsenic discovered to be contained in DW of many

1990' – switch to new political-economical system

2000' – Accession to EU, ratification of PWH

Some words on the new system

New rules

- **The duty of drinking water supply goes municipal**
 - most specialized companies split others remain
 - water begins to have economical value
 - water (price) is becoming subject of political fight
- **Updating legal system is behind schedule**
- **Differences grow between**
 - a small group of powerful and professional state/private companies contracted to supply and
 - a large number of small companies of low-moderate expertise and assets
- **New detailed regulation on the supply and providers**

Facts and figures

- Population of Hungary: 10,2 M
- Number of settlements: 3165 (Stat Off.)
 - settlements over 5000: 280 (68 % of the population)
 - smallest settlements (with consumption <100 m³/d): 55 % of all with 8,8% of pop.
- Number of water supply „units”: >3700 (variable in reports)
- Water capacity: 900Mm³/y;
- Water production: 500 Mm³/y
- 99,0 % of the population have access to municipal water supply
- average consumption: 112 liter/person/d



Legal background

Water Management Act (1995): governs the frame of supply structure (ownership, economic structure)

Government ordinances of 38/1995 and 21/2002 set the detailed rules of operation and access and the responsibilities of operators

Public Health Act (1991): arranges for the public health authorities' control functions

Drinking Water Ordinance acc. 98/83/EC sets the rule on water quality

Water Service Utilities Act needed: missing control over economy and service performance

Institutional background

Water and infrastructure is the property of the municipality operated by supply companies

350 supply company of which

- 41 producing >2 Mm³/y provide 89% of all water produced**
- 5 state owned**
- most is owned by one to >200 municipalities**
- some is owned by foreign companies**

Authority control

- in terms of environmental resources and technical requirements: regional environmental authorities**
- in terms of water quality monitoring and surveillance: local to central public health authorities**

Water supply by origin

- 94 % groundwater ; within that**
 - 46 % bank filtered water**
 - 36 % confined deep well**
 - 9 % karstic water**
 - 3 % unconfined groundwater**
- 6 % surface water (river, lake and reservoir)**

Main water quality issues

1. **Geogenic „contaminants” from confined aquifers: As, B, F, NH₄, Fe, Mn, organics (KMnO₄ demand) and consequences**
2. **Age and inferior fabric of supply infrastructure – lack of reconstruction (issues of economy and regulation)**
3. **Vulnerability of water resources – low grade water safety – risk of infections and antropogenic contamination**
4. **Domestic distribution – ignorance of problem sources – communication needs**
5. **Data acquisition and treatment**

General overview of data problems

- **Data acquisition and treatment**
 - **prolonged lack of regulation (partly resolved recently)**
 - **poor technology of data transfer**
 - **lack of domain integration (of environmental and health dept. data)**
 - **no clear outline of water supply zones**
- **Lack of modern database (hw & sw) and consequently**
 - **inferior data quality and safety**
 - **variable report outcomes**

| National summary | category | bacteriology | chemistry | microscopy |
|------------------|--------------|----------------|-----------------|-----------------|
| | | check | check | check |
| Supplier's QC | On request | 37237 | 18025 | 3274 |
| | complies | 35405 | 20064 | 5111 |
| | not complies | 3349 (8,5%) | 4690 (18,2%) | 1279 (20,0%) |
| | Unacceptable | 571 (1,4%) | 947 (3,7%) | — |
| | total | 39325 | 25701 | 6390 |
| Authority check | On request | 4369 | 2469 | 847 |
| | complies | 5514 | 4004 | 853 |
| | not complies | 907 (14,0%) | 806 (16,2%) | 895 (51,2%) |
| | Unacceptable | 73 (1,1%) | 149 (3,0%) | — |
| | total | 6494 | 4959 | 1748 |

Geogenic water contaminants

Five-year data review to enhance reliability
(+ expert appraisal)

Arsenic

- Hungary was exempted from EU LV of 10
- Recent convincing epi study outcomes
- Health administration decided to apply EU LV from now to protect public health
- 428 settlement + 46? affected (~ 1,4 M)
- + 132 settlement needs intervention
- Drinking Water Improvement on way but too slow (ignorance and political dispute)

Geogenic water contaminants 2

Boron

- Hungary was exempted from EU LV of 1
- Health admin decided to apply EU LV
- 46 settlement + 7? affected (~ 95000)

Fluoride

- 5 settlement + 3? affected (~ 7000)

Geogenic water contaminants 2

Ammonium (2007)

- 18 % of tests > 0,5 in 711 settlements (~ 19 % of all)

Nitrite (2008) – results of enhanced surveillance included

- by bioconversion from ammonium
 - 1435 non complying test results (3,4 %)
 - occurred in 203 settlements (5,6 %)
 - more than once in 142 (3,9%)
 - in several samples in 100 (2,8%)
- not a problem in most with high NH₄

Geogenic water contaminants 3

Iron (2007)

- 10,5 % of tests $> 0,2$ in 818 settlements
(~ 21,8 % of all)

Manganese (2007)

- 17,7 % of tests $> 0,05$ in 1000 settlements
(26,7% of all – most those with high Fe)
- KMnO_4 demand as source of
(micro)biological proliferation (see next
slide)

Microbiological contamination 1

Coliforms (2008)

- **Possible consequence of both inferior structural integrity and excess organics**
- **6,2 % of tests CF positive**
- **38,8 % of settlements affected**
- **2,9 % of settlements involved in series of CF occurrences more than once**

Microbiological contamination 2

E. coli (2008)

- **concern for microbiological safety – risk of infections/outbreak**
- **1,1 % of tests positive**
- **8,4 % of settlements affected**
- **2,8 % of settlements with occurrence more than once and out of them 2,1 % with >10 % frequency**
- **1,6 % of settlements involved in series and 0,5 % more than once**

Microbiological contamination 3

Enterococci (2008)

- **Less frequently tested FIO**
- **2,4 % of tests positive**
- **11,5 % of settlements affected**
- **2,5 % of settlements with occurrence more than once and out of them 2,3 % with >10 % frequency**
- **0,6 % of settlements involved in series and 0,1 more than once**

Other antropogenic contamination

Nitrate (2008)

- Widely tested (in almost all settlements)
- 0,3% of tests above LV
- 0,3 % of settlements affected (12)
- 0,14 % of settlements (5) concerned by several occurences

Lead

- Rather occasional testing (1/4 of those tested for nitrate)
- 0,6% of tests (9 settlement) over 10 mcg/L
- 0,2 % of tests (3 settlement) over 25 mcg/L

Thank You For Your Attention!

