

GROUNDWATER SOURCE PROTECTION PROGRAM IN HUNGARY

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BACKGROUND

- **95 % of 310 million m³/day surface water originates from abroad**
- **groundwaters: 5 % of the country's total available water resources,**
- **more than 90 % of the drinking water supply is based on groundwater resources**

availability
spatial distribution
quality

- **abstracted groundwater (million m³/day)**

karstic	0,4	(0,6)
bank-filtered	0,9	(1,1)
shallow gw	0,1	(0,2)
deep (confined) gw (licensed)	1,3	(1,8)

Legal background

Act on environmental protection 1995

Act on water management 1995

Government decrees on

**protection of drinking water sources
(1961) 1997**

**groundwater resource and soil protection
2000**

Area classification by pollution sensitivity

“A” Areas of elevated sensitivity, intervention pollution limit value $C_i = C1$

- a) Ecological (green) corridors designated by a separate act of legislation, and areas included in the list of Natural Waters of International Significance are,
- b) the 0.25 km wide strip along the shoreline of lakes owned by the state under Act LVII of 1995 on water management,
- c) karst areas where limestone, dolomite, lime- and dolomite marl formations are situated on, or within 10 m depth of, the surface,
- d) core, external and “A” hydrogeological zones designated under a separate act of legislation around developed and future sources of drinking water supply, abstraction of mineral- and medicinal waters, further also the “B” hydrogeological zones around karst-, unconfined groundwater and bank filtered sources of drinking water supply,
- e) national parks, prominently protected nature conservation areas, biosphere sanctuaries,
- f) areas earmarked for protection mentioned in clause e) of category “A”, registered by the ministry responsible for the environment and the designation procedure of which is already under way.

“B” Sensitive areas, intervention pollution limit value $C_i = C2$

- a) The 0.25 – 1.0 km wide zone along the shoreline of owned by the state under Act LVII of 1995 on water management,
- b) all karstified areas not included in category “A”, where limestone, dolomite, lime- and dolomite marl formations are situated within 100 m depth of the surface, except where demonstrated by a local investigation that a risk substance takes more than 100 years to reach the aquifer from the surface,
- c) hydrogeological zones designated, or being designated under a separate act of legislation around developed and future sources of drinking water supply, abstraction of mineral- and medicinal waters, which are not classified into category “A”,
- d) all areas, under which the main aquifer is less than 50 m deep below the surface, or is between 50 and 100 m depth, but the cover formation consists of sand or gravel and the area is not classified into category “A”, except where demonstrated by a local investigation that a risk substance takes more than 100 years to reach the main aquifer from the surface,
- e) all areas under which there is no main drinking water aquifer formation, but a yielding layer (at least equivalent to sand) exists in the vicinity of the surface,
- f) nature conservation areas of national, or local significance, not covered by clauses a) and e) of category “A”, further the protective (buffer) zones designated under a separate act of legislation of the nature conservation areas covered by clauses a) and e) of category “A”,

- g) areas mentioned in clause f) of category “B” earmarked for protection, registered by the ministry responsible for the environment, or in the case of areas eligible for local protection, by the clerk of the municipality, and the designation procedure of which is already under way.

“C” Moderately sensitive areas, intervention pollution limit value $C_i = C3$

Other areas not included in categories “A” and “B”.

Annex 2/2
to the Governmental Decree 33/2000. (III. 17.) Korm.

Special local sensitivity studies

1. In the case, where under more than 95 per cents of the area within the political boundaries of a community, pollution is transported downward by the percolating water across the lower boundary of the first saturated zone at rates higher than 0.5 m/year while pumping at the highest safe yield, the sensitivity classification of that community of the result of a detailed local study may be revised on the basis of the result of a detailed local investigation made by, or for, the interested parties and approved by the competent authority.
2. The sensitivity category determined for the administrative area of a community may be modified for a clearly defined thoroughly explored part-area of the same community, on the basis of
 - 2.1. the 1:100 000 scale pollution sensitivity map (VITUKI Rt.) available at the environmental inspectorate, or
 - 2.2. the result of a detailed local investigation made by, or for, the interested parties – in compliance with the requirements set forth in Annex 2/1 - and approved by the competent authority.

Government decree on the protection of actual and prospective sources of drinking water (1997)

➤ **obligatory in public water supply**

➤ **protection zones by travel time**

- **inner** (20 days)
- **outer** (6 months)
- **hydrogeological A** (5 years)
- **hydrogeological B** (50 years)
- **(hydrogeological C** total recharge area)

➤ **pollution sources and polluting activities listed in details are restricted within the protection zones differently ("principle of balanced protection") depending on the type of the pollution source/activity and according to the**



- protection zone (inner, outer, A,B,C), the shorter the travel time the stricter is the restriction

- status of the pollution source /activity (existing, or a new one)

(the alternatives in the licensing are:

(a) both are forbidden,

(b) new is forbidden, the existing can be continued in certain conditions,

(c) both can be allowed in certain conditions,

(d) no restrictions;

➤ **- problems**

DRINKING WATER SOURCES (WELL-FIELDS)

IN OPERATION

PROSPECTIVE

≈ 1600

75

Vulnerable: 626

all

**(cca. 65 % in capacity)
(travel time: 50 years)**

**Well-field: - abstraction well(s)
- aquifer (surface and subsurface
recharge area) and water
- protection area,
- monitoring**

POLLUTION SOURCES

point forming

unsewered settlements
waste disposals
land fills
industrial and army sites
fuel tanks,
animal farms
liquid manure storage
improper storage of agrochemicals
abandoned wells
active and abandoned mines

(lineal)

roads
railroads
pipelines

diffuse

agriculture

Tasks and responsibilities

Act on Water Management 1995.

***subsurface waters and the natural aquifers are owned exclusively by the state**

***task of the state: designation of possible water withdrawal areas (prospective drinking water sources) and preservation of them in a usable condition**

***persons or entities who or which acquired rights to utilise the water resources shall keep the utilised water resources safe in proportion to the extent of the utilisation**

("Water resources developed for water withdrawal: an area or subsurface part of the space, which is used or designated for utilisation by intake works as well as the water available for the withdrawal therefrom, together with the existing and planned water taking facilities."

Act on the local municipalities 1990

***task of the municipalities is to provide healthy drinking water to the inhabitants**

Vulnerable sources used for drinking water

626 well fields

4520 km² estimated protection area

**3080 m³/d water abstraction (proposed
for protection)**

**2118 m³/d water abstraction (licensed
presently)**

type of the aquifer	no. of well-fields
karstic	136
bank-filtered	52
shallow	80
confined	358

Scheme of the well-field protection

- **DELINEATION OF THE PROTECTION ZONES**
(travel time: 20 days, 6 months, 5 years, 50 years)
 - **INVENTORY OF THE POLLUTION SOURCES**
 - **DESIGN AND IMPLEMENTATION OF THE MONITORING SYSTEM**
 - **DETERMINATION OF THE HYDROGEOLOGICAL PROTECTION AREA**
-

Scheme of the well-field protection (cont.)

- **ASSESSMENT AND PROGNOSIS**
(potential and actual pollution sources, pollution processes, transport models etc.)
- **PROPOSAL FOR MEASURES TO BE TAKEN TO PRESERVE AND TO IMPROVE WATER QUALITY**
- **COST BENEFIT ANALYSES FOR ALTERNATIVES**
- **DECISION**
- **OFFICIAL RESOLUTION ON THE PROTECTION AREA**
- **IMPLEMENTATION OF THE DECIDED ALTERNATIVE**

***SAFEGUARDING**

ST
1 phase

FACT FINDING

Aerial photos

**Field investigation on the recharge area
(geology, land uses, pollution sources)**

Complex analyses of water samples

**Revision of the existing monitoring wells
(revision of abandoned wells for the
purpose of monitoring)**

**Design and implementation of the complex
monitoring system**

Measuring the water levels, study of the effects

Accurate geodesy

GIS

Hydraulic and transport models

Risk analyses

Proposal for the necessary measures

Cost benefit analyses

1993. Program for the protection of prospective sources

1995. government decision on the program for the protection of drinking water sources financed from the central budget

(shared tasks, weak enforcement of the former regulation, "state's debt")

1996. preparation of the individual projects for public tendering

1997. Start of the program

Selection of the well-fields (priorities):

- pollution detected in the abstracted water,**
- pollution detected in a monitoring well,**
- the number of the people supplied from the well-field**
- the lack of the possibility to construct a new well-field in the case of a serious pollution (there is no prospective well-field or other available water resource nearby)**
- the protective measures taken by the municipalities earlier**

Program implementation

1997-2001 232 source in operation
66 finished till 2000
(235 settlements, population: 1,8 million)

51 prospective source
40 finished till 2000

costs: 8 billion HUF \approx 32 million EU

2002-2009 394 source in operation
35 prospective source

costs: cca. 21 billion HUF \approx 84 million EU

Experiences

results are used for many purposes

the main pollution sources are :

- **unsewered settlements**
- **animal farms**
- **old industrial pollution (clean up program)**

public awareness is increasing