THE STATUS OF WATER RESOURCES IN ROMANIA

SITUATIA RESURSELOR DE APA DIN ROMANIA

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Abstract: *The presence of our country among the EU countries, determines a better assessment and information on issues regarding groundwater resources. The main point of view is aiming at developing industry and agriculture that promote unlawfully use of these water resources which in turn are vital to supply drinking water to most villages in Romania. By informing about the dangers involved in the case of loosing control over the groundwater and depth water intake, we can establish national programs to fight and reduce the inadequate exploitation.*

Rezumat: *Prezenta tarii noastre in cadrul UE determina o mai buna evaluare si informare asupra problemelor de management a resurselor de apa subterana. Principalul punct de vedere vizeaza dezvoltarea industriei si agriculturii care promoveaza folosirea neregulamentara a acestor resurse de apa, care la randul lor sunt vitale pentru aproizionarea cu apa potabila a majoritatii localitatilor din Romania. Prin informarea despre pericolele care exista in cazul scaparii de sub control a captarilor de apa freatica si de adancime, se pote actiona prin programe nationale pentru combaterea si reducerea exploatari neadecvate*

Key words: *groundwater, polution, exploitation.*
Cuvinte cheie: *apa subterana, poluare, exploatare.*

INTRODUCTION

By introducing the topic on groundwater in Romania points out the importance of these resources in socio-economic development of Romania in a clean environment, appropriate to the standards of EU countries. The purpose of the study is highlighting and marking of the main problems that are existing in this area by exposing various quantitative and qualitative aspects of water resources in their range of use for better protection and conservation.

Because knowing the full range of groundwater bodies is impossible, the establishment of a suitable management for long term conservation of qualitative and quantitative level is also impossible.

The possibility of maintaining and sustainable exploitation of groundwater and depth water resources is the top priority, because the advantage to be hard evaporated contributes to maintain the level of drinking water needed in dry seasons.

In recent years because of inadequate aquifer exploitation it is seen an increasing growth of aquifer losses, that in the perspective that water intake from groundwater has decreased dramatically in the last 30 years.

The study is aimed at drawing attention to the preservation of water resources of our country, in accordance with the Framework Directive 2000/60/EC, where water resources are defined as heritage to be preserved, protected and treated as such.

MATERIAL AND METHOD

*"*Groundwater - means all water under the land surface in the saturation zone and in direct contact with soil or subsoil*";*

(Directiva Parlamentului si a Consiliului European 60/2000/ec)

After defining the term of groundwater, we can perform the evaluation and creation of the overview on the use of its capabilities as a resource.

Total groundwater resources are divided as follows:

- 4,7 billion m^3/year for *groundwater;*
- 7,7 billion m^3/year for *depth water;*

As follows (*Table 1*) deep groundwater flow is more abundant but at the same time as it is more sensitive to changes in environmental conditions, occurred following anthropogenic influences.

Table 1

Groundwater resources in river basins (by Romanian Waters National Administration)

Nr. Crt	DIRECTIA APELOR	Groundwater aquifers (<50 m)	Groundwater aquifers (>50 m)
		Resources balance (l/s)	Resources balance (l/s)
1	Somes - Tisa	7873.9	4364
2	Crisuri	8944.96	11389.9
3	Mures	9433	5265.9
4	Banat	7560	5151.98
5	Jiu	13550	7898.7
6	Olt	11718.8	15580.6
7	Arges - Vedea	27707	84652.2
8	Buzau - Ialomita	28180	13649
9	Siret	14637	2555
10	Prut	3917.9	9156.3
11	Dobrogea - Litoral	15889.3	84833.4
TOTAL		149411.86	244496.98

Taking into account that in Romania deep groundwater are the predominant source for drinking water supply of the population especially in rural areas, protection and careful exploitation is very important.

Although in Romania is known to groundwater resources of Quaternary rocks, some of which are currently used, the degree of knowledge of all groundwater bodies is far from being sufficient to apply sustainable management.

Predominantly Type: P-porous, K-Karst, F-split;

Coating: thickness in meters of deck coating;

Water use: PO-water supply population, IR - irrigation, I - industry, P - fish; Z - animal husbandry;

Pollutant: I - Industrial, A - agricultural, M - garbage, Z – zoo technical;

Global Environmental protection: PVG - very good; PG - good; PM - average; PU - unsatisfactory; PVU - highly unsatisfactory;

Qualitative and quantitative status: Good (B), weak (S).

Table 3 data are from the assessment made by the Water Directorate Olt, is an example of the characteristics of groundwater bodies in Romania.

After a quick look on the degree of overall protection of groundwater bodies (Table 2) we can deduce that the situation in bodies of water throughout the country is established between poor and average.

Table 2

Characteristics of some groundwater bodies (by Romanian Waters National Administration)

	Caracteriz. geol./hidrogeol.			Utiliz. apei	Poluatori	Grad de protectie globala	Stare	
Code/nume	Tip	Sub pres.	Strate acop.				Calit.	Cant.
1	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Depresiunea Ciucului	P	Nu	5.0 - 10.0	PO, I	I	PM	S	B
2. Depresiunea Braşov	P	Nu	4.0 - 8.0	PO, I	I	PM	S	B
3. Munţii Perşani	F+K	Mixt	variabilă	PO		PU, PVU	B	B
4. Munţii Bârsei	K+F	Nu	variabilă	PO		PVU	B	B
5. Depresiunea Sibiu	P	Nu	0.5 - 6.0	PO, I		PM	B	B
6. Lunca pârâului Hârtibaciu	P	Nu	0 - 3.0	PO	A, M	PM	B	B
7. Depresiunea Făgăraş	P	Nu	0 - 0.5	P ,I		PG,PVG	B	B
8. Lunca şi terasele Oltului inferior	P	Nu	2.0 - 8.0	PO, I, P	I, A, M	PM	S	B
9. Lunca Dunării (Bechet-Tr.Măgurele)	P	Nu	3.0-12.0	PO,P		PM	B	B
10. Depresiunea Ciucului	P	Da	50.0-60.0	PO,I		PG, PVG	B	B
11. Depresiunea Braşov	F+K	Da	40.0 - 50.0	PO, I		PVG	B	B
12. Nocrich-Buneşti	P	Da	> 80	PO		PG,PVG	B	B
13. Vestul Depresiunii Valahe	P	Da	10.0-100.0	PO, Z		PVG	B	B
14. Vânturariţa-Buila	F+K	Mixt	0 - 0,5	PO		PM, PU	B	B

RESULTS AND DISCUSSION

Articles extracted from water law in force:

- **Art. 9 (4):** *„Use of groundwater is based on reserves determined by hydro geological study"*
- **Art. 38:** *„To ensure rational use of groundwater, lakes and sludge treatment and the mineral aggregates of riverbeds, research and evaluation will be made under the provisions of existing legislation"*

So and therefore we can see (table 3) that in Romania there are no problems with regard to over-exploitation of groundwater aquifers. Because of a poor review about local use of water, you can see an increase in water use for irrigation and various farming.

The intensification of agriculture and a greater need for irrigation of field crops for higher yields and to avoid droughts, illegal capture of depth water is inevitable.

An example may be the negative experiences that countries like Istrael have suffered due to agriculture based on deep groundwater drilling that have gradually dried up water aquifers, consequently water resources of this country is compromised.

Sensitivity of groundwater exploitation is due to their partial omission in the water cycle in nature, so that depth water is not participating in the water cycle in nature, that's why they are drained and hard to replenish.

Increasing use of deep water for industry and population is another issue that can not be ignored because the economic growth of recent years has made the need for water to grow without the focus on the degree of decline of aquifer levels.

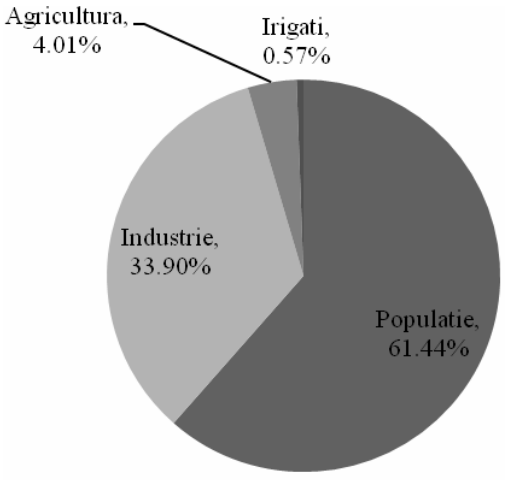
A better qualitative and quantitative protection can be achieved by careful monitoring of boreholes and groundwater exploitation of our territory.

Issue of admit and approvals with a tighter control flow used in economic activities.

Table 3

Volumes of water captured from the underground spread across the main uses (by Romanian Waters National Administration)

NR. CRT	Water Direction	CAUGHT WATER MIL. M^3				
		Population	Industry	Agriculture	Irigation	Total
1	Somes - Tisa	19.9	12.2	0.5	0	32.6
2	Crisuri	17	17	0.8	0	34.8
3	Mures	21.7	10.2	0.9	1.1	33.9
4	Banat	10.9	10.3	0.1	0	21.3
5	Jiu	33.7	18.7	9.7	0.5	62.6
6	Olt	48.9	18.7	0.9	0.5	69
7	Arges - Vedea	25	40	2	0.3	67.3
8	Buzau - Ialomita	49.	41.4	5.9	0.1	97.2
9	Siret	75	45	3.1	1.3	124.4
10	Prut	3.4	3.1	0	0	6.5
11	Dobrogea - Litoral	97.4	5.9	2.4	0	105.7
Total		402.7	222.5	26.3	3.8	655.3



Distribution of percentage of water catchments depending on use

An evaluation of long-term flows witch can be captured for a better protection of groundwater aquifers.

CONCLUSIONS

Romania's presence among the country's with a vast resource of groundwater makes the implementation of protection and management that can be deployed on a longer term and unnecessary restriction of access from this resource.

The development of the socio-political environment should not be ignored because there will be an increase in water requirements. The main fear that exists is that contamination of shallow water with harmful or toxic substances of economic activities or household.

Global warming endangers growing freshwater resources of the surface which lead to an increasing need to capture and use of underground water resources. In particularly, deep waters have suffered which can not regenerate and meet human needs at reasonable pace.

The assessment of major polluters (Table 2) notes that they are found mainly around the general economic activities in our country, making a greater synthesis of polluters can express that industry along with agriculture are strongly involved in the process of pollution.

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