RESOURCE EXPLOITATION ASSESSMENT OF GROUND WATER BASIN CRISURI

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Abstract

The article presents the evaluation and mode of operation of underground water resources in the catchment Crisuri, in 2009, the nine bodies of groundwater related basin. The paper contains summary data on knowledge and use of groundwater, in categories depending on the specific uses and users of these waters, recording and exploitation of groundwater resources available resources, actions and measures necessary for supervision, protection and preservation of these sources.

Key words: groundwater, evaluation, volumes, resources, exploited.

INTRODUCTION

The purpose of this paper is to make a clear record on the knowledge of the structures within the basin aquifer on Cris, exploitable groundwater resources, the water volumes exploited for various purposes, and to adopt viable strategies to prevent, protection and conservation of groundwater resources subject to anthropogenic influences (both quantitative and qualitative). In this paper, we follow the evolution of groundwater exploitation in the three rivers basin area, during 2009, the nine bodies of water (ROCR01, ROCR02, ROCR03, ROCR04, ROCR05, ROCR06, ROCR07, ROCR08), h.b. related Cris, as well as groundwater body ROSO04 allocated h.b. Somes - Tisa, compared with total precipitation aquifer feeds or additional contributions.

The pursuit of these goals allows continuous indication of groundwater resources available at any time and involves an intensive and competent.

Currently surface water sources am relatively well known, both quantitatively and qualitatively, while underground water resources, although sometimes locally were studied and investigated in detail (by sector and river basin), have fluid balance was evaluated as the basis for determining the potential hydrogeological, on bodies of groundwater. Importance of this research lies in the fact that speech and criteria for assessing the standard of living achieved relies on the degree of equipment indispensable plumbing of buildings and the water consumption per capita.

MATERIAL AND METHOD

Knowledge flows, or annual volume of groundwater is the main way exploited that can appreciate the spatial and temporal possibilities of meeting the needs of drinking water. Given the fact that most inhabitants of the mountain and hillside areas with rural population in plain areas make up about one percent. 55% of the total population, those more than 22 million

inhabitants of the country is fed, for the most part, the groundwater resources through springs, drains, wells or boreholes domestic small and deep. On the other hand, the lack of sewerage systems and centralized drinking water supply in rural areas and of maintaining a relatively high level of water pollution in the country are almost impossible to provide this population with drinking water standards appropriate existing national and international.

Water is widespread in nature, however finding and capturing water sources to support water supply to population centers or industry, both quantitatively and qualitatively, often presents great technical difficulties and economically. To achieve the water supply systems highly technical and require optimal capital expenditure is required knowing the sources of water, their characteristics and criteria of choice, according to the conditions imposed by the consumer.

RESULTS AND DISCUSSION

Catchment three rivers, groundwater abstraction are performed by three systems:

- Collection from drilling single or fronts, which is made from free-level aquifers (groundwater) aquifer and the level of pressure (depth)
- Collection from the drains
- Collection from sources

In Table 1 and Figure 1 presents the volumes of groundwater exploited in 2009, expressed in thousand cubic meters per year, respectively operated flow (l/s) level amounts to free exploited aquifers (groundwater) and aquifer-level pressure (depth) on water bodies. In the table are indicated the number of abstractions (boreholes) and the depth of groundwater.

Table 1

Exploitation of groundwater wells and deep

H.B.	Groundwater Body	Exploitation wells in aquifers with free level			Exploitation wells in aquifers with pressure level		
		V water expl. (Thousand cubic meters / year)	Q tot. expl. (l/s)	Nr. Drillings	V water expl. (Thousand cubic meters / year)	Q tot. expl. (l/s)	Nr. Drillings
Crisuri	No body assigned	152.29	12.84	110	38.70	1.31	9
Crisuri	ROCR 01	1392.22	78.33	599	-	-	-
Crisuri	ROCR 06	31.96	1.20	20	1978.28	72.44	133
Crisuri	ROCR 07	660.23	30.68	100	3512.22	132.09	325
Crisuri	ROCR 08	-	-	-	6697.47	248.35	368
Crisuri	ROCR 09	326.33	10,65	38	-	-	-
TOTAL GENERAL		**2563,04**	**133,70**	**867**	**12226,67**	**454,19**	**835**

In the year 2009, out of 1702, the capture operation 867 collects water from underground layers, 835 layers traps water in medium and deep aquifers.

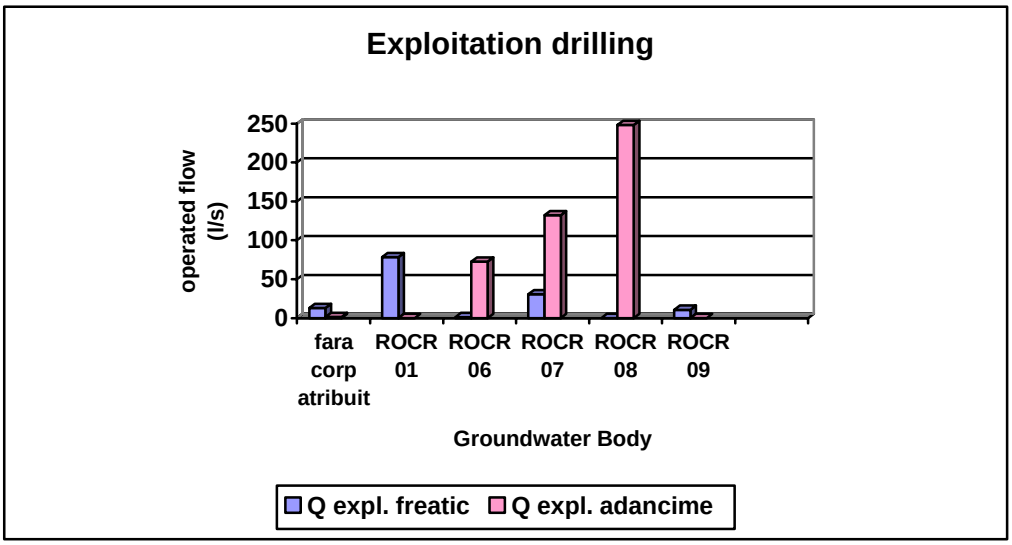

Fig.1 Flow freely exploited aquifers and aquifer-level pressure

Table 2

Operation of drainage wells and springs

H.B.	Groundwater Body	Operating through drains			Operation by springs		
		V water expl. (Thousand cubic meters / year)	Q tot. expl. (l/s)	Nr. Drillings	V water expl. Thousand cubic meters / year)	Q tot. expl. (l/s)	Nr. Drillings
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Crisuri	No body assigned	531,87	16,86	4	138,26	4.978	48
Crisuri	ROCR01	22511,695	715,39	9	-	-	
Crisuri	ROCR02	-	-	-	578,85	24,296	21
Crisuri	ROCR03	-	-	-	-	-	
Crisuri	ROCR04	-	-	-	-	-	
Somes-Tisa	ROSO04	-	-	-	7,25	0.270	10
Crisuri	ROCR05	-	-	-	1155,173	36,766	24
Crisuri	ROCR09	689,85	22,29	2	-		
TOTAL GENERAL		**23733,415**	**754,54**	**15**	**1879,54**	**66,31**	**103**

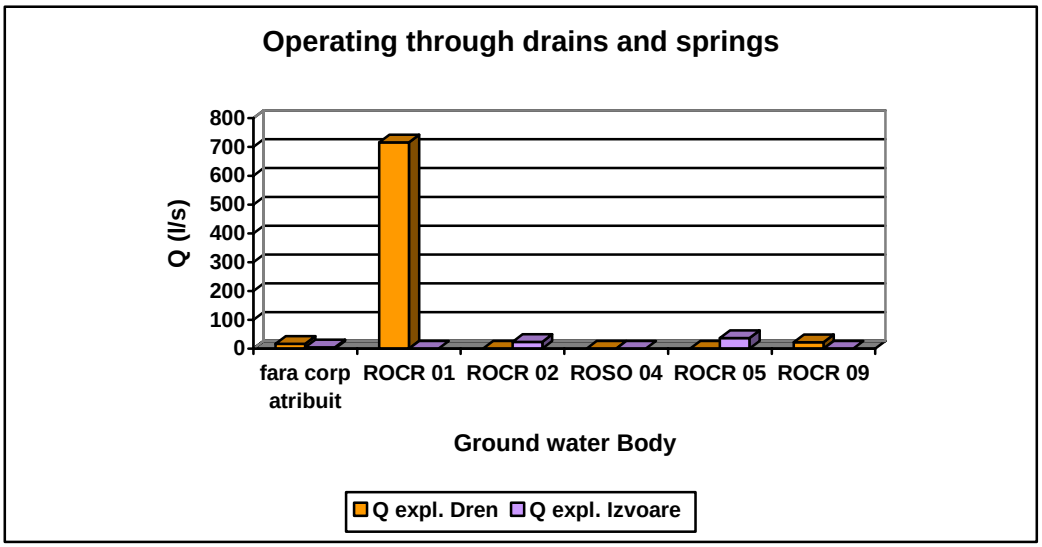

Fig. 2 Flow drains and streams exploited

Table 3

The total volume of the aquifer tapped by category of use

H.B.	Groundwate Body	POP.	IND.	ZOOT.	Irrigation	OTHER DESTINATION	TOTAL WATER USERS	
		V. expl.	V. expl. %	V. Expl. %	V. expl.	V. expl.	V. expl.	Q Expl.
		(Thousar cubic meters year)	(Thousand cubic meters / year)	(Thousand cubic meters / year)	(Thousand cubic meters / year)	(Thousand cubic meters / year)	(Thousand cubic meters / year)	l/s
Crisuri	No body assigned	515,23	341,41	4,49	-	-	**861,12**	**35,99**
Crisuri	ROCR01	11737,7	12075,11	79,17	11,37	0,55	**23903,915**	**793,72**
Crisuri	ROCR02	332,39	246,5	-	-	0,0	**578,85**	**24,296**
Somes Tisa	ROSO04	7,25	-	-	-	-	**7,25**	**0,270**
Crisuri	ROCR05	426,282	728,89	-	-	0,0	**1155,173**	**36,77**
Crisuri	ROCR 06	1010,22	820,93	177,09	2,00	-	**2010,240**	**73,64**
Crisuri	ROCR 07	2411,66	1320,32	366,30	13,15	61,02	**4172,45**	**162,77**
Crisuri	ROCR 08	3872,64	2392,23	393,31	36,30	3,0	**6697.47**	**248.35**
Crisuri	ROCR 09	298,84	717,35	-	-	-	**1016,18**	**32,94**
TOTAL GENERAL		**20612,2**	**18642,74**	**1020,36**	**62,82**	**64,57**	**40402,65**	**1408,74**

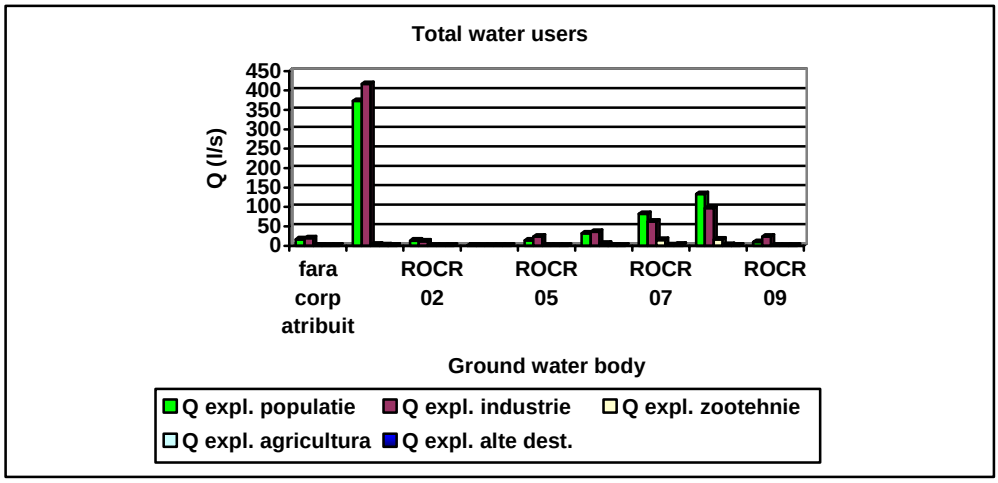

Fig.3 Exploited groundwater flow categories of users

Centralization of operational resources and availability of existing groundwater abstracted from the groundwater layer, average depth and the depth, on the nine bodies of water associated with Cris River Basin, was based on data submitted by the National Institute of Hydrology and Water Management, in 2009. For 2009, we have prepared tables 4, 5, 6 which results in groundwater resources, ie bodies of water flow available.

Table 4

Evidence of phreatics groundwater resources and availables groundwater resources

BH	Body Code	Body surface area (Km^2)	Water Resource (l/ s)	Q expl.. (l/s)	V expl. (mii m^3/an)	Q available (l/s)
Crisuri	ROCR 01	6858.21	8263.17	793,72	23903,915	7469,45
Crisuri	ROCR 02	592,14	424,33	24,296	578,850	400,03
Crisuri	ROCR 03	175,03	105,02	-	-	-
Crisuri	ROCR 04	31,12	18,67	-	-	-
Crisuri	ROCR 05	140,54	56,21	36,77	1155.173	19,44
Crisuri	ROCR 09	195,13	97,56	32,94	1016,18	64,62
Total phreatics			**9364.01**	**887.996**	**26661.368**	**8352,36**

Table 5

Evidence of groundwater resources and the average depth of resources available

BH	Body Code	Body surface area (Km^2)	Water Resource (l/ s)	Q expl.. (l/s)	V expl. (mii m^3/an)	Q available (l/s)
Crisuri	ROCR 06	3802.75	2161.94	73.64	2010.24	2088.3
Crisuri	ROCR 07	8435.61	6859.58	162.77	4172.45	6696.81
Total average depth aquifer exploitation			**9021.52**	**236.41**	**6182.69**	**8785.11**

Table 6

Evidence of groundwater resources and the average depth of resources available

BH	Body Code	Body surface area (Km^2)	Water Resource (l/s)	Q exploatat (l/s)	V expl. (mii m^3/an)	Q available (l/s)
Crisuri	ROCR 08	9055,82	6280,93	289,79	6838,50	5991,14
Total exploitation of deep aquifers			**6280,93**	**248,35**	**6697,47**	**60,32,58**

CONCLUSIONS

In the year 2009, out of 1823, the capture operation 867 collects water from underground layers, 835 layers trap water in medium and deep aquifers, plus the springs 103 and 223 drains. (Table 1 and table 2) .

Of these, in 2009, was taken from the phreatic water flow of 887,996 l / s compared to 9364.01 l / s, which is the water resource, such flow is available in 2010 for 8352.36 2010 l / s.

Average depth of aquifers, groundwater bodies and ROCR07 ROCR06 operated flow in 2009 was 236.41l / s, and the water resource is 9021.52 l /s, resulting in a flow available 6032.58 l / s.

In the deep aquifers, the groundwater body ROCR08 was operated a total volume of 248.35 l / s, the water resource in 2009 it is 6280.93 2009 l / s and results for year 2010 a debit of 6032.58 available.

Analyzing tables 4,5 and 6 shows that in 2009 there Cris basin flow surplus. Also in the area of cities Marghita and Oradea, where he operated a large number of wells and drains, there is still a large potential resource.

Returning to the need for knowledge of groundwater resources emphasize once again that water is a very valuable raw material for which no alternatives exist. Therefore, any evaluations, studies and forecasts that are not based on a thorough knowledge of these resources may lead to false conclusions, unrealistic, unwise to the location of water consuming objective, the overload of aquifers or bodies water, culminating in partial or total degradation of water reservoirs.

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