

The Challenge of Transboundary Aquifer Resources Management in the Azerbaijan Republic -multidisciplinary and multifunctional approaches

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ABSTRACT

Successful management of the shared water resources of the Kura-Araz Rivers Basin is critical to the social, economic, and ecological prosperity for all countries of the region. The practical and just solution of this problem requires a multidisciplinary approach that encompasses various expertise and disciplines. And find a way of solving this problem is very important, especially, for Azerbaijan where about 70% of the surface water is transboundary resources and the aquifers systems generally do not follow political boundaries.

Key words: transboundary aquifer; water resources management.

1. INTRODUCTION

Azerbaijan(86,600 km²) is situated within the Alpine fold belt and includes mountain regions of the Greater and the Lesser Caucasus, the Kura inter-mountain depression and part of the Caspian Sea. Azerbaijan has common borders with Armenia, Georgia, Iran, Russia and Turkey; and maritime boundary with Iran, Kazakhstan, Russia and Turkmenistan. Of the available annual average fresh water quantity of 367 billion m³, 70% are the waters of Transboundary Rivers of Kura, Araz, Ganykh, Saumur, and Astarachai. Most of all groundwater are also in transboundary aquifers (Fig. 1).

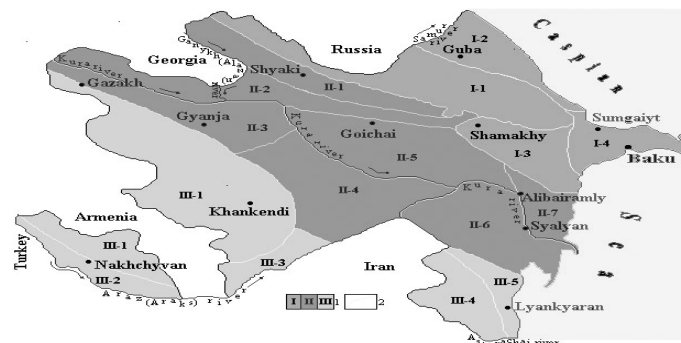


Fig.1:

Scheme of Azerbaijan hydrogeologic zoning

1. Hydrogeological regions; 2. Boundary of hydrogeological regions; I - Greater Caucasian hydrogeological basin: I-1 - Greater Caucasian mountain - fold region; I-2 - Gusar region; I-3 - Gobustan region and the adjacent part of the Near-Caspian lowland; I-4 - Absheron region. II - Kura depression hydrogeological basin: II-1 - Alazan-Agrichai region; II-2 - Adjinoour-Jeiranchel region; II-3 - Gyanja-Gazakh region; II-4 - Mil-Garabakh region; II-5 - Shirvan region; II-6 - Mugan-Saliyan region; II-7 - South- Eastern Shirvan region. III - Lesser Caucasian hydrogeological basin: III-1 - Lesser Caucasian mountain - fold region; III-2 - Nakhchyvan region; III-3 - Jabrail region; III-4 - Mountain- Talysh region; III-5 - Lyankyaran region

2. BACKGROUND INFORMATION

The research results show that in the territories of Turkey and Iran environmental conditions of Kura and Araz Rivers are relatively better. The Kura River in the Georgian Varsiya - Akhalkalaki

region and Araz beginning from Gumru region of Armenia to Azerbaijan territory are polluted. The annual amount of polluted waters coming from Armenia into Araz River is about 2.6 km³ and from Georgian territory into Kura River is about 4.2 km³. In the current situation, the groundwater (GW) plays an important role in all fields of endeavor providing Azerbaijan Republic with sustainable development (2).

Within the geologic-structural features of the region, several GW basins can be recognized: the Greater Caucasus basin, the Kura basin, and the Lesser Caucasus basin. Within these basins, sixteen sub-regions (corresponding to field survey of fresh GW - aquifers) are identified based on the nature of the hydrogeological setting (1). From the 16 identified fields of fresh GW resources, eleven of them are Transboundary Aquifer (TA). Practically about 90% of the fresh GW of the Republic falls in the category of TA and potentially it can produce over 12 million cubic meters (m³) per day (Fig. 1).

3. PRESENT CONDITION

It may seem that the problem associated with TA is relatively new for Azerbaijan. There existed in the USSR internal boundaries between republics. Even then due to contamination and the lack of plans for regional use of TA, their share use was a great concern for Azerbaijan. Today the framework is an Inter-State problem and it is much more difficult to solve. Worldwide experience in the resolution of TA problems (3) demonstrate that the solution has many aspects (scientific, legal, socio-economic, institutional, environmental).

3.1 Scientific aspects

Just since the first years of the last century, hydrogeologic investigations in Azerbaijan have been conducted regularly. The first purposeful investigations are associated with the search for sources of water supply of the Grate Baku area. From 1939 to 1948 a network of wells to conduct monitoring of groundwater's regime in Azerbaijan was established. More intensive study of hydrogeological conditions started from 1945 to 1990. During that period data on the GW regime, balance and resources were systematized. The last 10-20 years especial attention has been paid to studies as it relates to contamination of GW (1, 2).

3.2 Legal aspects

The legal base adopted in the republic is meets principal legal codes of developed countries. As far as regulations are concerned there are no obstacles for the promulgation and protection of WR both inside the country and TWR. The " Water code of Azerbaijan" and the law "About Interiors of the Earth" approved by special session of legislators of Azerbaijan on December 26, 1997 and April 27, 1998 respectively lay down the principles for any negotiation on the subject matter of TWR. Unlike Armenia and Georgia, the supreme legislative body of Azerbaijan ratified all International conventions associated with the subject matter.

3.3 Socio-economic aspects

To emphasize the importance of WR of the TA in the socio-economic development of Azerbaijan it should be mentioned that about 50% of water supply of Baku city and the other two biggest cities in the republic (Gyanja and Sumgayit) is provided by the GW of the TA and about 70% of these waters are used for agricultural needs and industry.

3.4 Institutional aspects

At present and during the transition of Azerbaijan to a market economy there is an adaptation of the management structure of the WR in the leading countries of the world. The legislation has already fixed that the use of the WR is a prerogative of the local authorities, though control on the right use is in the competence of the Committee on Melioration and Water Resources. At the same time, after some reorganization, all the functions of former committees on geology and hydrometeorology had been passed to the re-established Ministry of Natural Conservation. It is quite natural that in this period when the authorities are not powerful enough the actual management of the WR in the republic is carried out by the above mentioned ministries. Thus this problem is still urgent and it needs a competent solution.

3.5. Environmental aspects

Environmental protection and maintenance of the TA ecology is another urgent problem in the republic as it reaches the inter-state level. The urgency of the problem may be illustrated by the example of the Alazan-Agrichai TA of Azerbaijan and Georgia. More than a million people of both countries live within the region. Intensive contamination of the environment since the time the territory was part of the USSR has resulted in serious pollution of the WR. Water sample from the ground and surficial sources in the territory of Georgia and Azerbaijan contain nitrates, heavy metals and some radioactive elements in amounts that exceed acceptable existing standards.

CONCLUSIONS

The element which unites all countries is the understanding that to achieve success it is necessary to study all aspects of the TWR problem well. In this connection for Azerbaijan (in our opinion for other States of region as well) it is important together with the use of its own resources to seek joining numerous programs in the framework of UNESCO, UNECE, UNDP, WMO, etc. On the one hand, it will help to use the rich world experience of highly qualified experts and on the other hand it will result in a complete transparency of results. In this case (one can confirm confidently) such organizations like UNO, OSCE and others can perform as arbiters. By all means this will lead to the conclusion of a multilateral agreement between all countries of the region.

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