

DAVAMLI İNKİŞAF VƏ SU TƏHLÜKƏSİZLİYİ ONUN AMİLLƏRINDƏN BİRİ KİMİ: QLOBAL TƏCRÜBƏ VƏ DAXİLİ POTENSİAL

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Xülasə

Tədqiqat işi su təhlükəsizliyi və hal-hazırda qüvvədə olan uyğun idarəetmə sistemi haqqında bəhs etməkdədir. Azərbaycan Respublikası suyun idarəedilməsi ilə bağlı hüquqi çərçivəni davamlı əsasda reform etməkdədir. Yaxın iki ildə bu haqda çoxlu qanun və normativ aktlar qəbul olunmuşdur. Su infrastrukturunu ən vacib sahələrdən biridir. Azərbaycan da bunu etiraf edir və müstəqillik əldə etdikdən sonra ölkənin su ehtiyatlarından daha səmərəli istifadə etmək üçün bir çox qanunvericilik aktları həyata keçirilib. Büyyük miqdarda sudan istifadə edən ənənəvi kənd təsərrüfatı aparılmaqdadır. Körfəz ölkələri daha çox su içən kənd təsərrüfatı məhsullarını minimuma endirmək qərarına gəliblər. Müəllif hesab edir ki, Azərbaycanda da belə olmalıdır. Digər tərəfdən, sudan istifadə edən bitkilərin xarici ölkələrdən alınması vasitəsi ilə əvəzlənməsi lazımdır. Dəniz suyundan içməli su istehsal edən böyük bir infrastruktur da var. Azərbaycanda bir neçə zavod olmasına baxmayaraq, müəllif bəzi su ehtiyacları üçün dənizdən istifadə potensialının olduğunu iddia edir. Tədqiqat işi geniş regionda və Azərbaycanda ekoloji və su problemlərindən bəhs edir. Azərbaycan Cənubi Qafqazda adambaşına düşən suyun ən az olduğu ölkədir. Deməli, gec olmadan tədbirlər görmək lazımdır. Tədqiqat işində Azərbaycan və daxil olduğu daha böyük regionun ekoloji və su ilə bağlı problemlərdən bəhs etməkdədir. Tədqiqat işində kənd təsərrüfatında və digər sahələrdə su ilə bağlı problemlər haqqında təkliflər verilmişdir.

Açar sözlər: su resursları, su təhlükəsizliyi, torpağın insanlar tərəfindən zəbti, suyun çirkəlməsi

SUSTAINABLE DEVELOPMENT AND WATER SECURITY AS ONE OF ITS FACTORS: GLOBAL PRACTICES AND DOMESTIC POTENTIAL

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Abstract

The paper is about water security and related management issues currently at work in the Republic of Azerbaijan. The country is constantly reforming the water management legal environment. There are many

laws and normative acts being enacted, nowadays. Water infrastructure is one of the most vital fields. Azerbaijan acknowledges this and after gaining independence many legislative act have been enforced to make better use of the water resources of the country. There is a traditional agriculture that uses water in large quantities. Gulf countries have made a decision to minimize the agricultural products that drink more water. The author believes that this should also be the case in Azerbaijan. On the other hand, there needs to be a substitution of water-using plants by buying them from outside world. There is also a growing field that makes drinking water from sea water. Although there are several plants in Azerbaijan, author maintains that there is a potential to use sea for some water needs. The paper talks about the ecological and water problems in the broader region and Azerbaijan. Azerbaijan is the country with lowest amount of per capital water in South Caucasus. So, there is a need to take actions before it is late. The paper proposes several recommendation to solve the water issues in agriculture and beyond.

Keywords: *water resources, water security, soil sealing, water pollution*

УСТОЙЧИВОЕ РАЗВИТИЕ И ВОДНАЯ БЕЗОПАСНОСТЬ КАК ОДИН ИЗ ЕГО ФАКТОРОВ: МИРОВАЯ ПРАКТИКА И ОТЕЧЕСТВЕННЫЙ ПОТЕНЦИАЛ

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Резюме

В статье рассматриваются вопросы водной безопасности и связанные с ней вопросы управления, актуальные в настоящее время в Азербайджанской Республике. Страна постоянно реформирует правовую систему управления водными ресурсами. В настоящее время принимается множество законов и нормативных актов. Водная инфраструктура является одной из важнейших сфер. Азербайджан осознаёт это, и после обретения независимости был принят ряд законодательных актов для более эффективного использования водных ресурсов страны. Традиционное сельское хозяйство страны потребляет большое количество воды. Страны Персидского залива приняли решение минимизировать производство сельскохозяйственной продукции, потребляющей больше воды. Автор считает, что это должно произойти и в Азербайджане. С другой стороны, необходимо заменить водопотребляющие растения, закупая их за рубежом. Также существует отрасль, производящая питьевую воду из морской воды. Несмотря на наличие в Азербайджане нескольких предприятий, автор утверждает, что существует потенциал использования морской воды для некоторых нужд. В статье рассматриваются экологические и водные проблемы в регионе в целом, и в Азербайджане. Азербайджан является страной с наименьшим количеством воды на душу населения на Южном Кавказе. Поэтому необходимо принять меры, пока не поздно. В статье предлагается ряд рекомендаций по решению проблем с водными ресурсами в сельском хозяйстве и за его пределами.

Ключевые слова: *водные ресурсы, водная безопасность, изоляция почвы, загрязнение воды*

INTRODUCTION

Environmental concern is receiving growing amount of attention every day. Water resources are scarce and through time they are going to get more scarce. Every country needs to cater for the water management both globally and domestically. Even today's water abundant countries are going to face water scarcity in the near future. Humanity can not live without water and its sustainable production and preservation.

In Azerbaijan, water resources are being governed by several government bodies. The fresh or drinkable water was governed by Azersu till 2024, after that The Azerbaijan Water Management Agency (AWMA) was established by president decree. The irrigation and technical water is governed by AWMA, as well. Although several managers of such bodies have been appointed in mentioned bodies, there is still a room for improvement.

In literature, there are new trends of calculating water carbon, water, ecological (CF, WF, EF) footprints to understand consumption and environmental pressures on the Earth's atmosphere, bioprotective areas, and freshwater resources (Brad et al., 2012, Mohsen & Mohammad, 2023). Although there are growing acceptance of these measures, there is lower harmony with one another (Brad et al., 2012). Conservation agriculture can be a solution to some of the problems that we face (Antonella et al., 2017). Grassland ecosystem restoration is another solution proposed (Kelly et al., 2023). One study shows that agriculturally used lands have received more pollution than the industrial used lands (Saeidi et al., 2023). This is the reason we need to be careful in planning agriculture within country. There are many drawbacks in increasing the agricultural production.

First and foremost, agriculture as an industry uses much of the water. In many countries agriculture uses more than 90 percent of the freshwater resources. It is like a system that eats 90 percent of the water the country possesses and produces some number of agricultural foods. The thing is that this system is far from ideal to say the least. Agriculture uses bulk of the water and produces fruits and other crops. For Azerbaijan agriculture is a foreign generating resource. But one needs to be very choosy to claim that agriculture is benefitting the economy. In Azerbaijan the agriculture is mainly focused on the crops that use heavily on the excessive usage of the water in essence. It is not a fault of farmers but the crop production is practiced like this in every country. It has been more than 30 years that agricultural crops are not chosen by the government to be cultivated. Azerbaijan has seen the fruits of new policies. It is time to be more economical and, in more benefit, to use both water and land resources to produce the crops that "eat" less water and resources to grow.

Second, water usage has many problems within agricultural systems. It is difficult to avoid access usage of water for water-loving crops. It is also difficult to account for amount of used water per most of the bulk of farmers. Many countries have difficulty in finding systems that ensure avoidance of water leakage and inefficiencies.

As a remedy, some countries have decided to consider which crops are "feasible" in terms of water usage. GCC countries have chosen to look at the water needs and after that decide to consider on a large scale (Mohsen & Mohammad, 2023). As it is very difficult to control the water flow within agriculture it is one of the best decisions to make. In the former Soviet Republics water was abundant, many countries not represented in the Union did not have water issues in the past mostly. So former Union Republics did not consider water issues. But it was then water was not considered, now almost every country in the world needs to consider water in the equation. The world is a closed system. We do get rainfall from the skies but there is no other interconnected system that constantly supplies freshwater into the world. So, it is of higher importance to manage water resources of the world. In order to ensure this every country needs to act responsibly. There are upstream and downstream and both upstream and downstream countries in terms of water resources.

There are 2 conditions in terms of water flows. Downstream and Upstream conditions. Upstream water conditions mean the territory is high in latitude and water resources (lake, river, etc.) either start and flow or stay there. Downstream water condition means that water comes from other places and either flow or stay there. Upstream countries hold the starting water resources; downstream countries hold inflowing of water from upstream countries. All types of countries need to find a solution so that every country economy function sustainably. There is a need for the dedicated negotiation within countries in order to ensure sustainability for every country.

Azerbaijan is mostly a downstream country. Most of the water is produced outside country. So, Azerbaijan seeks negotiation from all of its neighbors to work in the sustainability route. Biggest freshwater bringing rivers are Kura and Aras rivers. They both start from Türkiye. Kura enters from Georgia into Azerbaijan. Aras enters from Türkiye into Azerbaijan and Iran. Still Azerbaijan could not negotiate a deal with Georgia on transboundary water flows. There are, also, problems with other neighbors. As water issue is one of the most important in the world, it is no coincidence.

Soil sealing is another factor for concern (Ahmadov, 2020). There is growing number of urbanizations in both neighboring countries and in Azerbaijan. So, there is a high chance that soil sealing is a big factor in the country.

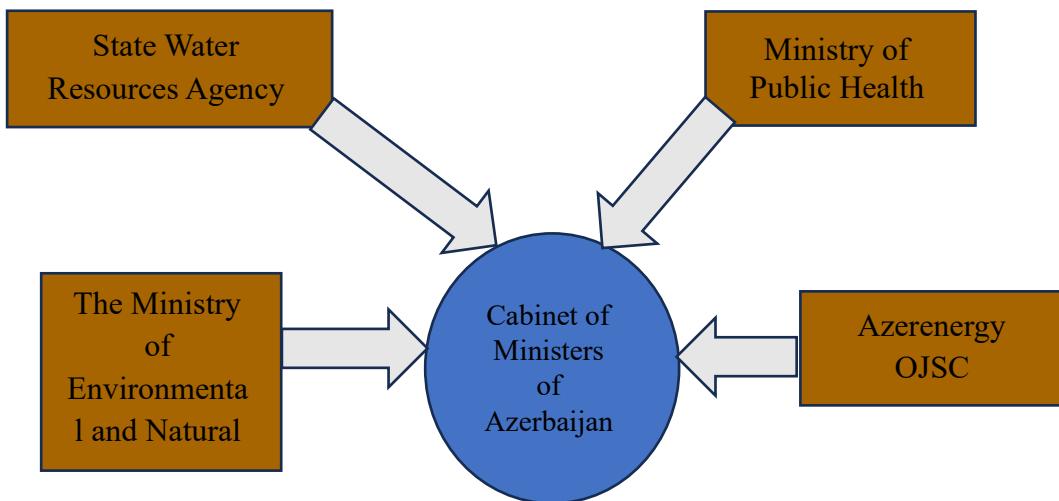
Azerbaijan is located in South Caucasus. Transcaucasus region possesses 168 km³ (Eppelbaum & Khesin, 2012) water resources but there is increasing pressure of water scarcity in the region. It is due to the inefficient water usage and irrigation, contamination. There is a decreasing surface water availability, pollution from neighboring countries. Kura-Aras River basin is contaminated and brings its roots from neighboring countries. There is a growing need for the unified water management system in the Transcaucasus region. There is a need for the cooperative water management treaty between Turkey, Georgia, Armenia, Iran and Azerbaijan.

Climate challenge is another problem for water quality and management. Public policy should be focused on the spheres where it is possible to effectively manage the water resources (Ahmadov, 2020). There is a need to focus on the transborder water cooperation (Ahmadov, 2020).

Current Situation

Currently, Azerbaijan has several (8359 rivers and 450 lakes) water resources. Like any other country, Azerbaijan faces several issues related with water management. These issues are water pollution, soil sealing, inefficiency in agriculture sector and other problems. Currently, Azerbaijan Republic water resources management framework looks like as following.

Fig1. Institutional structure in water resources management in Azerbaijan.



Source: Data taken from "Strategic Road map for the development of utilities (electricity and heat, water and gas) in the Republic of Azerbaijan and compiled by Author (President of the Azerbaijan Republic Decree 1138, 2016).

Azerbaijan State Water Management Agency was established in 30 March 2023 with a president decree. After regaining complete sovereignty over its all territory, Azerbaijan has built many hydro-electric stations to better manage all the water resources and make use of it through generating and distributing energy to new settlements after the occupation. This will help Azerbaijan generate more energy and make use of its whole capacity. Also, water reservoirs were built at liberated territories. This will help Azerbaijan to make better use of its water resources.

Azerbaijan government has enacted National Program for sustainable Socio-Economic Development 2 periods (2004-2018, 2018-2025), where one of the sections is fully devoted to water policy issues (Ahmadov, 2020).

Every government needs to manage and direct the flows of water for many purposes (drinking, energy generation, cultivation, manufacturing, etc.). There are companies that need to produce and seek or ask water from government for many purposes (transfer, sales, production, etc.). On the other hand, the water rainfall is difficult to forecast/prognosis and thus it is difficult to plan for people, governments and companies. Also, there is a global warming and other ecological changes that poses many problems for everybody within country. Another issue is pollution that can indefinitely harm water reservoirs or start the chain of actions that will make impossible for water to clear itself.

In Azerbaijan 30% of total volume of water resources available for use is formed within country and about 70% are water coming from transboundary sources (Ahmadov, 2020). So, there is a considerable amount of transboundary water inflow from neighboring countries. It means that there is a possibility of water pollution from neighboring countries. The numbers mentioned proves that there needs to be a very effective water management system within Azerbaijan to suit the needs of the growing population within country.

Problematic Issues

After going over current situation let's focus on the problems that Azerbaijan faces in respect to water management. The most pressing issue is that Azerbaijan's internal water resources are 28% (MENR, 2023). 70% of the remaining water resources are those formed at the expense of transboundary rivers (MENR, 2023). So, there is a greater need to establish fruitful cooperation among neighboring countries to effectively manage the transborder water flows. There are two biggest river basins. They are Kura-Aras

River basin and Samukh river basin. Both Kura and Aras rivers start from mountainous of neighboring countries. Azerbaijan is a downstream country so it is important to agree with upstream countries on water management. Despite Azerbaijan's efforts, it is not possible to make an agreement on the Kura River under the UNECE water convention 2016 with Georgia (MENR, 2023).

Azerbaijan faces water scarcity and resulting stress. There is high dependency from transboundary waters. There is a limited internal water resource. To be honest, there are very few countries that control the water of the Trans Caucasus region. They are Turkey, Georgia. Armenia also has many water towers but Azerbaijan lacks water towers. As a result, our country needs to think of the ways to use what it controls wisely and economically. Water is one of the resources that is becoming less and less every coming year in the world. Pressure from increasing number of city residents negatively affects the water distribution within the country.

High water losses is another reason for concern. Heavy irrigation has long been negatively affecting ground waters. Ground waters in its turn affects the freshwater amount that can be distributed to the population. The urbanization process also puts pressure on the amount of fresh water that can be distributed. Although there is an increase in amount of fresh water that can be distributed, the country is building growing number of modern cities within Karabakh region of Azerbaijan. After its liberation from Armenian occupation, Karabakh region has seen unprecedented amount of city building. When governments build new cities, there is an increased amount of pressure on the ability of the nature to produce fresh water.

Water quality and pollution is another domestic problem. Climate change is yet another thing that negatively affects the water distribution domestically. There are several points of this problem. First, there is an industrial and agricultural pollution. Secondly, there is a sewage discharge.

The water resources have decreased from 30 billion cubic meters to 17 billion cubic meters in 2022 (Alexander et al., 2024). Around 70% of water resources are used for irrigation in Azerbaijan (Pasha, 2021). Even after declining number of water per capita huge amount of water is used in agriculture. As agriculture is used inefficiently in the world, in Azerbaijan agriculture inefficiently uses the declining water reserves. This in itself is a big problem. Even though people are left with less water per capita, more and more agriculture is produced that mostly uses water resources inefficiently. There needs to be a calculated amount of water usage for every crop in the country. GCC countries have started to consider from this point of view (Mohsen & Mauhammad, 2023). Fresh water resources are declining resources. Every country needs to take this problem seriously. Azerbaijan has been heavily reorganizing water management environment. This is a very relieving factor. But there needs to be more steps in this field. The biggest consumer of the water resources is agriculture in an average country. Azerbaijan is no exception. Azerbaijan has been famous for many vegetables and fruits. It is time to consider the potential of water resource of mother nature in Azerbaijan.

There is a problem of irrigation. In essence it is a problem of waste water. The farmer wants to cultivate some crop. It uses several materials to make the cultivation. In addition to the essential materials there is a need to use some fertilizers. They have been used in cultivation for many decades. In some countries these fertilizers are used more than the norm. Azerbaijan is one of these countries. During cultivating for bigger harvest farmers are using lots of fertilizers. They are making many damages. One of these problems is damaging ground water around the farm.

Conclusions and Recommendations

Having considered the current situation and problematic issues, let's focus on the points that can be concluded. As a water demand increases in Azerbaijan due to urbanization, agricultural usage and climate change, there is a need to better manage all the water flows. Azerbaijan has started to make water balance and monitor its water resources; there is a need to enact comparable monetary fines for pollution of every

kind (especially industrial). There is a need to make water balance accountable through command-and-control systems.

After going through the conclusions, let's see what can be recommended under all beforementioned:

1. There should be agreement on water management with all border countries around Azerbaijan. This is the most important issue. This agreement should include constant (at least yearly) monitoring in the issues of water preservation, carriage and all other important issues;
2. The government bodies responsible for water usage and management and preservation (ASWRA, Azerenergy OJSC, and other responsible government bodies) should make a robust and accountable system of monitoring, evaluation, pollution and ecological burden and tax, proliferation of transborder and domestic water resources;
3. There is a need to heavily regulate agriculture so that water-intensive agricultural crops should be imported not made, the crops that use less water are to be chosen to cultivate in the country (see (Mohsen & Mauhammad, 2023) about GCC countries they have chosen to do so) as Azerbaijan is not abundant in water resources;
4. There is a need to regulate water prices for the agriculture differently than for other purposes. There should be a balance of prices for the agriculture. There is a need for both increase the prices for water and make subsidies to the farmers. The subsidies should not exceed pre-determined threshold so that to efficiently use water resources.

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