UNDERSTANDING AND SOLVING WATER SECURITY IN KAZAKHSTAN

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Abstract. Awareness of the special role of water and its exceptional social significance in terms of human rights to safe and reasonably clean water has become the basis for solving the problem of ensuring water security. In terms of water availability, Kazakhstan is one of the most scarce countries in Central Asia. Despite the fact that the Institute of Geography initiated the development of a specialized scientific and technical program "Resource Assessment and Forecast of the Use of Natural Waters of Kazakhstan under Anthropogenic and Climate-related Changes", supported by the Secretariat of the Security Council and the Ministry of Education and Science of the Republic of Kazakhstan, issues of water supply regulation in the country, water savings even at the household level remain open. Kazakhstan continues to experience water shortages.
In this article, the author tried to identify the main causes of water shortages in Kazakhstan and give a list of recommendations.
Keywords: water security, national security, irrigation, transboundary rivers.
JEL codes: F42, H56, H70, I31, R58, Z18, Z28

Аңдатпа. Сумен қамтамасыз етудің негіздері судың ерекше рөлін түсіну, оның қауіпсіз және таза болуы айрықша әлеуметтік маңызы бар адам құқығы тұрғысынан сезіну болып табылады. Орталық Азиядағы сумен қамтамасыз ету тұрғысынан Қазақстан ең тапшы елдердің бірі болып табылады. География институты Қауіпсіздік Кеңесінің Хатшылығы мен Қазақстан Республикасы Білім және ғылым министрлігінің қолдауымен «Антропогендік және климаттық өзгерістерге байланысты Қазақстанның табиғи суларын пайдалануды болжау және ресурстарды бағалау» атты мамандандырылған ғылыми-техникалық бағдарламаны әзірлеуге бастамашы болғанына қарамастан, суды тұрмыстық деңгейде үнемдеу, елдегі суды реттеу мәселелері шешілмей отыр. Қазіргі таңда Қазақстан Республикасы су тапшылығын сезініп келеді.
Бұл мақалада автор Қазақстандағы су тапшылығының негізгі себептерін анықтап, ұсыныстарды әзірлеген.
Түйін сөздер: су қауіпсіздігі, ұлттық қауіпсіздік, суландыру, трансшекаралық өзендер.
JEL кодтар: F42, H56, H70, I31, R58, Z18, Z28

Аннотация. Осознание особой роли воды и ее исключительной социальной значимости в аспекте прав человека на безопасную и достаточно чистую воду стало основой для решения проблемы обеспечения водной безопасности. По водообеспеченности Казахстан является одной из наиболее дефицитных стран в Центральной Азии. Несмотря на то, что Институт географии инициировал разработку специализированной научно-технической программы «Оценка ресурсов и прогноз использования природных вод Казахстана в условиях антропогенно и климатически обусловленных изменений», поддержанную Секретариатом Совета безопасности и Министерством образования и науки Республики Казахстан, вопросы регулирования водообеспечения в стране, экономии воды даже на бытовом уровне остаются открытыми. Казахстан продолжает испытывать дефицит воды.
В данной статье автор попытался определить основные причины нехватки воды в Казахстане и дать список рекомендаций.
Ключевые слова: водная безопасность, национальная безопасность, ирригация, трансграничные реки.
JEL коды: F42, H56, H70, I31, R58, Z18, Z28

Introduction

The United Nations Organization predicts that by 2030 the population of Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan will reach the number of 82 million people, and by 2100 — 100 million people [1]. As for the territorially largest Kazakhstan, here the number will increase by about 20,5 million by 2030 [2]. An increase in population leads to growing demand for agricultural and industrial products, and for water, that causes water scarcity. The aggravated situation in water governance is complicated by the lift of irrigation evaporation and low efficiency of melioration systems, together with 60% of the population living in rural areas [3]. Water scarcity is deteriorating due to the discharge into the rivers and the collector-drainage network of water poisoned by pesticides and pesticides used in agriculture, as well as polluted industrial effluents and municipal water. In terms of water availability, "Kazakhstan is one of the most water scarce countries on the Eurasian continent" [4].

A special place in this problem is

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occupied by the drying up of the Aral Sea, which includes the environmental and socio-economic consequences of this process, the deterioration of the water resources of the Aral Sea basin, as well as issues of water use. All of these points lead to negative consequences in the field of water use and significantly affects the sustainable development of the economies of Central Asia.

By taking into account above-mentioned words, the purpose of this article is to provide a critical up-to-date report on the water scarcity and ways to solve this problem in Kazakhstan. It is worth noting that Kazakhstan is the main economic force in Central Asia. Since water is a major natural resource for all Central Asian states, the ability to use this resource in a responsible manner holds an important key to the peaceful and sustainable future of Central Asia. In addition, we present the current situation on solving the main issues of transboundary water management between Kazakhstan and other Central Asian countries. Finally, we make a conclusion and discussion on possible ways forward.

Water scarcity in Kazakhstan and Central Asia: hypothesis or reality?

Water shortage or deficit conditions will be a problem that by 2025 will encounter more than 2.8 billion people in 48 countries. Moreover, by 2050 this figure is projected to rise to 7 billion [5].

Water is an important restraint on the economic progress of virtually every country and region. This state of affairs exists due to the rise in worldwide water use collectively with augmented water contamination. Climate alteration is another explanation for the impairment of the circumstances. Consequently, all these factors are the basis for the emergence of new internal and external conflicts around water resources.

Central Asian area is the object of a pressing issue – water scarcity. Significant distinctions in the water distribution and its major use occur in this region. In Kyrgyzstan and Tajikistan, water is vastly used for the improvement of hydropower, meanwhile in Kazakhstan, Uzbekistan and Turkmenistan it is used mainly for irrigated agriculture [6].

Inadequate resource management leads to poor watering of new lands and lack of drinking water for the population. It is also appeared to be a problem, because the demographics of Central Asia are growing at an enormous rate. Global warming causes an imbalance of water resources, which in turn leads to the fact that the region's water resources are reducing, which does not apply to water-surplus regions themself.

If we consider Uzbekistan, over 18 000 natural watercourses and approximately 505 lakes are located here. For the irrigation purposes there were created 53 reservoirs. Kyrgyzstan, the country where the watercourse is formed, has several large lakes, such as Issyk-Kul, Chatyr-Kul and Son-Kul, and contains a total of roughly 1,900 lakes. **In consonance with data drawn by specialists from the MMWR (Ministry of Land Reclamation and Water Resources) of the Republic of Tajikistan and the World Bank, the share of river flows from Central Asian countries, including Afghanistan, in the Aral sea basin is distributed as following: Tajikistan provides 55.4%, Kyrgyzstan 25.3%, Uzbekistan 7.6%, Afghanistan 5.4%, Kazakhstan 3.9%, Turkmenistan 2.4%** [7].

The Republic of Kazakhstan has relatively small share of water resources formed on its land according to the number of lakes, rivers and glaciers. East Kazakhstan region, where the Irtysh river basin is located, is considered to be well supplied by water. However, for instance, the situation in Mangistau region is completely different and includes water deficit. It indicates that the general situation with water supplies in Kazakhstan is not homogeneous and differs by region. Aral-Syrdarya, Balkhash-Alakol and Irtysh are the biggest river basins of the republic, which together compose over 90% of water resources. The total number of local river basins is eight [8]. However, 50% of all water resources in the Republic of Kazakhstan are constructed outside of country. Main flow of Aral Sea basin (more than 80%) is formed on the territory of Tajikistan and Kyrgyzstan. These countries are interested in using available water resources to generate hydropower, while Kazakhstan, Turkmenistan and Uzbekistan intend to continue using these resources for irrigation purposes [8]. Water consumption increasing due to the increase of population and it's growing demand in water and diverse approaches to the water region generally

worsen the situation with water deficit, and mostly in Kazakhstan. To avoid tripling water scarcity by 2050, Kazakhstan needs to adopt efficient measures to address this problem [9].

During the last century, it is observed that the overall temperature in the Central Asian region has increased meanwhile precipitation has decreased. For instance, in Kazakhstan, the overall average annual temperature has grown by 1.4°C [10]. Similar climatic changes are evident not only in Kazakhstan, but also throughout all Central Asian countries. Climate conditions continue to worsen throughout Central Asia, and none of the present climatic scenarios assumes an increase in accessible water resources. Pursuant to the latest data obtained, by 2050 the volume of river flow in the Syr Darya river basin will be reduced by 6-10%, and the Amudarya — by 10-15% [10].

National Security Priorities in Official Documents and Statements in Kazakhstan

According to the paragraph 2 of the article 17 of the Law of the Republic of Kazakhstan dated January 6, 2012 No. 527-IV “On the National Security of the Republic of Kazakhstan”, the equilibrium of interests of a person and a citizen, community and the state and their reciprocal liability is the central condition for maintaining national security and perfecting the state of the environment, rational use of natural resources. Rational use of water resources has to be a priority to ensure the country's independence, since water scarcity is one of the problems of Kazakhstan.

The Republic of Kazakhstan explores the central issues of limited water resources, as well as enhances their use due to population growth. For example, the formation of the concept of water security in Kazakhstan is a subject of studying at the leading centre for comprehensive solutions to water problems — the Institute of Geography with the assistance of the Secretariat of the Security Council of the Republic of Kazakhstan. Important to say that the First President of Kazakhstan Nursultan Nazarbayev has formulated the action plan in this sphere — Strategy “Kazakhstan-2050”. This strategy defines the main stages of practical actions, they include ways of resolving the problems of drinking water by 2020 and watering of land in rural areas by 2040. According to the Strategy "Kazakhstan-2050", issued on December 2012, by 2050, it is presumed to fully eliminate the water supply issue in all areas of life.

As the result, specialists at the Institute of Geography started the creation and promotion of a specialized scientific and technical program called “Assessment of Resources and Forecast of the Use of Natural Waters of Kazakhstan with anthropogenic and climatic changes”. Their studies are formed on the basis of the concept of water security and the Strategy-2050. In addition, they take into consideration the worsening of water problems in Central Asia and great value of water resources for Kazakhstan [11]. Therefore, in 2012 was issued the monography «Water resources of Kazakhstan: assessment, forecast, management» was issued which offered tactic steps on solving hydrological threats by strategic saving and distribution of water where were shown the prospects of developing hydropower resources were shown in conjunction with the solution of water management problems based on the construction of large and small hydropower plants. The possibilities of developing commodity fish farming (pond, lake-commodity and industrial type) are substantiated, proposals are given for improving interstate water relations of Kazakhstan with neighboring countries in transboundary basins.

However, according to the experts’ opinion, there are still observed unresolved problems in Kazakhstan. For instance, there is no consolidated state body's policy on water management in the country. Moreover, scientists found discrepancies in water resources indicators and the lack of objective and reliable information reflecting the real state of the country's water sector.

In addition, a sharp deterioration in the environmental situation worsens the current situation in ensuring the security of Kazakhstan. At the heart of national security, however, is a quick response to technological and natural disasters, which indicates that Kazakhstan does not give preference, for example, to global water savings, including the quality of drinking water.

Main causes for water decrease in Kazakhstan.

Kazakhstan represented its

achievements on the UN's 6th Sustainable Development Goal «Clean Water and Sanitation», including availability and increase in centralized water supply in cities from 82% to 93.8% (by 11,8%), in the villages from 42.5% to 57.4% (by 14,9%) [12]. However, Kazakhstan still faced diverse challenges, for instance, about half (44.0 km3) of water resources are formed on the territories of other Central Asian countries [4] and decrease of river flow to 23.8 km3/year (to 21%) [13].

There are also other issues of water scarcity in Kazakhstan. The absence of a centralized authority that could be responsible for solving water policy problems is the main cause for the decrease of water resources in Kazakhstan. This centralized body could have also cooperated, united and exchanged information with international hydrological centres. Likewise, country does not have a complete water management policy that would be pledged in an integrated analysis from the formation to realization of state water supply programs. Moreover, the country does not have satisfactory amount of qualified staff from among climatologists, political scientists, hydrologists, and lawyers on water matters [14].

Water is undoubtedly significant problem for the entire Kazakhstan nation. However, it is not a priority for the country. This approach occurs because the key source of income for the state are products of the raw materials industry, such as uranium, gas and oil. Kazakhstan is a country oriented on the export of resources.

In addition, it is common that nowadays mainly media and social networks influence the formation of values for all people. For their part, they provide little coverage of water security problems, and it is the evidence to draw more attention to this issue. Official sources contain different sorts of imprecise data about water resources, which creates an adverse discourse about the work of functioning international organizations, domestic organizations and the Institute of Geography.

The second cause for the water scarcity is that water resources are being decreased not only due to Kazakhstan's negligent attitude to its water resources, but also because of cross-border problems of water discharge by neighbouring states. For instance, on the Ili River, located on the border with China, there is a question of a severe deficit of water resources. For Kazakhstan it may impact its largest lake — Balkhash, which may suffer from salinization and shallowing, if the rate of water withdrawal from China to the Xinjiang Uygur Autonomous Region progresses. For now, the water withdrawal is about 3,5 km^3/year, and it is predicted to increase to 5 km^3/year in the coming years [15]. In accordance with specialists, by 2050 the flow of the Ili river in Kazakhstan will be reduced by 40%, and when planned industrial (mainly oil-producing and refining) enterprises are put into operation in the river basin in China, river water pollution will rise [15]. The Kazakhstani part of the Ili river is already regarded as adverse due to pollutions produced by domestic, industrial and agricultural emissions, but the situation considered above will worsen environmental problems even more. The problems of regularizing the drainage of the Amu Darya and Syr Darya rivers have not yet been solved as well. The basins of Talas and Chu rivers keep suffering from a shortage of water, even though effective agreements were created. As reported by the world pollution index of water bodies, no river in Kazakhstan is considered to be clean. Ultimately, water withdrawal with neighboring countries negatively influences the water supply of Kazakhstan [15].

Finally, another reason for the lack of water is that the territory of glaciation is decreased by 0,8% every year, and the quantity of glaciers – by 1%. The disappearance of glaciers in their main mass by the end of the 21st century is one of the possible negative aspects of this problem [16].

Even in the time of coronavirus pandemic in the world and in Kazakhstan particularly, neither the media nor official bodies highlight the issue of water irrational waste, meanwhile water consumption is growing rapidly. The World Health Organisation released several recommendations to prevent infection, which include more frequent and thorough hands washing, wet cleaning of any indoors several times a day, wiping doorknobs and soles of the shoes before the entrance – all of which obviously increases water consumption. Regrettably, no comparative information was

detected on water consumption at the time of the quarantine period. Moreover, the Internet and official media did not reference any mention of saving water at least at the household level.

Conclusion and recommendations.

Severe lack of water is identified as one of the challenges for Kazakhstan by Yelbasy Nursultan Nazarbayev in the Strategy "Kazakhstan-2050". The problem of ensuring water resources should be carefully supervised in the Republic of Kazakhstan. If during the past 60 years, the use of drinking water in the world has grown by eight times, it is forecasted that by the middle of the century, a lot of states will have the need to import water [Figure 1]. As a number of regions of Kazakhstan are in urgent necessity of drinking water, the struggle for the ownership of sources is now getting an essential element of geopolitics [Figure 2].

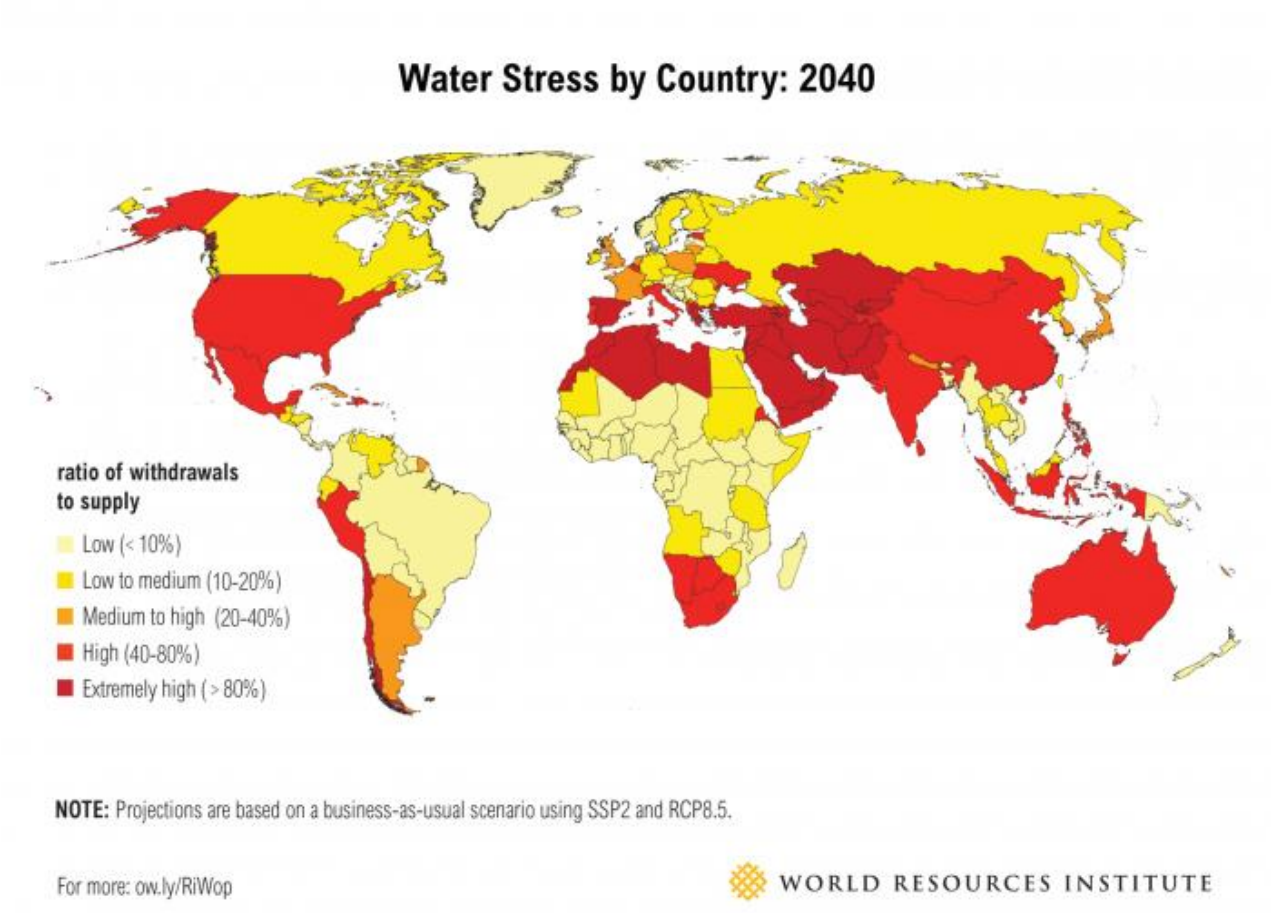

Figure 1. World Resources Institute. Water stress in the world, 2015.
Source: https://reliefweb.int/report/world/aqueduct-projected-water-stress-country-rankings

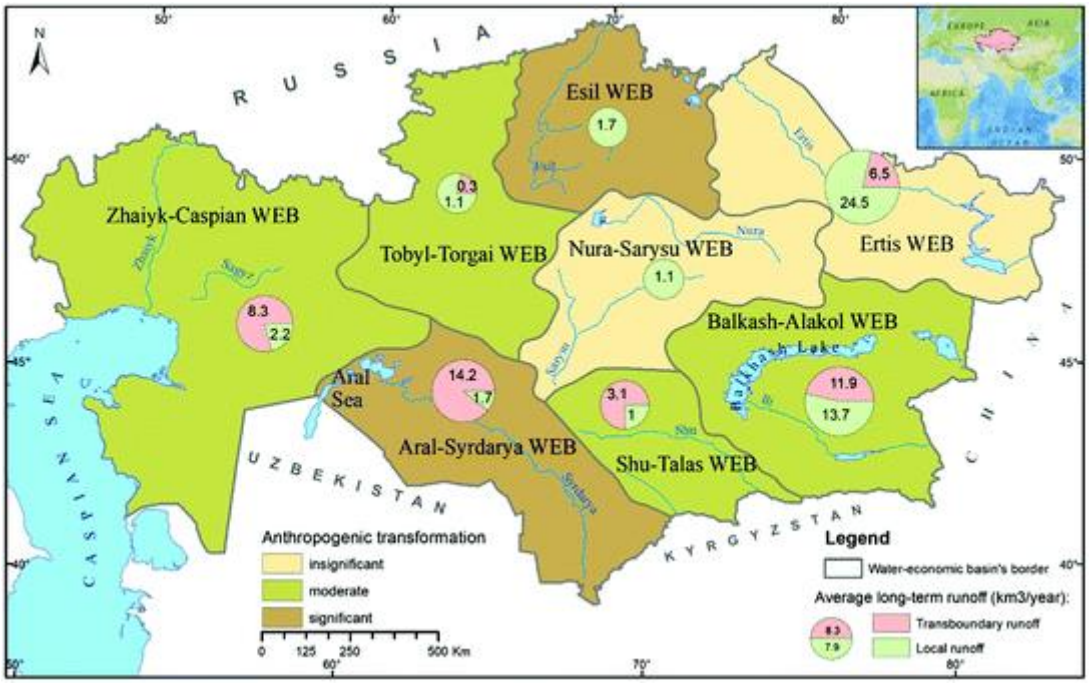

Figure 2. Water supply of river basins in Kazakhstan. Prognosis for 2030.
Source: https://link.springer.com/chapter/10.1007/978-981-13-0929-8_2

In summary, the following conclusions and recommendations can be distinguished:

1. In Kazakhstan, there is an inhomogeneous distribution of fresh water sources all over the country, with the use of obsolete water supply infrastructure built in the Soviet era. The economy of Kazakhstan is focused on the raw material base: oil and gas production, despite the projected shortage of water resources. The country does not pay due attention to the formation of water policy;

2. Solving the water issues between Central Asian countries requires meeting the needs of the population in the region and economic sectors in transboundary river basins. There is also the need in innovative approaches to international investment mechanisms of cooperation. Secondly, global water use strategy should focus on the use of highly efficient water-saving technologies.

3. There should be an integrated attitude to the creation of water policy in Kazakhstan that would include the development of a fundamental institutional framework for addressing matters linked to water resources in the form of specialized departments (ministries, departments). The current approach is not effective because decisions are often made by the public authorities responsible for the environment as a whole. This leads to a lack of balanced reflection of socio-economic gains and wastes of water resources. Thus, in all Kazakhstan's localities and villages, the main issue of drinking water supply has not been resolved even despite the adopted state programs;

4. In addition, other sectors of the economy, such as agriculture, industry, energy, transport and communications, are negatively impacted by water problems. Not only the economy suffers from water shortage, but also social sectors: health, environment, education, rural and regional development.

5. Thus, the water policy and its issues should be evaluated, examined and resolved in an incorporated overall development framework. Maximum coverage in official resources and actual realization of water policy should be one of the main challenges. Water policy should not stay only on paper, as effective results are required.

6. It is necessary for citizens to evaluate the level and progress of services provided from the planning stage to the stage of development of state water supply programs. The media does not fully cover water problems, so the average person is not aware of water deficit, consumption or budget expenditures in this area. Lack of awareness leads to the fact that there are a lot of activists in the country who stand against air pollution,

meantime there are barely any activists who are in favor of preserving water resources. It is important to note that the situation with water shortage is common in most of post-Soviet countries. Pursuant to specialists, countries need to adopt measures to efficiently articulate their water policies.

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ҚАЗАҚСТАНДАҒЫ СУ ҚАУІПСІЗДІГІН ТҮСІНУ ЖӘНЕ ШЕШУ

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ПОНИМАНИЕ И РЕШЕНИЕ ВОДНОЙ БЕЗОПАСНОСТИ В КАЗАХСТАНЕ

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