

THE SUPPLIES OF FRESH WATER AND MAIN INDICATORS OF THEIR UTILIZATION IN THE WORLD

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Abstract

Fresh water is one of the most important natural resources on the Earth which is necessary for humans to carry out economic activities and, unlike many other resources, has no alternative. This circumstance makes fresh water, perhaps, the most important irreplaceable natural resource that determines the way of life of mankind both in the present and in the future. Due to the pollution of the waters of the World Ocean as well as the global warming on the one hand and the growth of population on the world and the increase in the scale of the world economy on the other hand, the demand for fresh water has increased both in certain regions and in specific countries.

At the same time in individual economic unions and group of countries differing situations have currently arisen with respect to water productivity and water supply for rural and urban populations.

Comparison of the World Bank indicators of freshwater for Mediterranean economic unions and groupings shows shortcomings the elimination of which in the near future should become the subject of enhancing management over water resources implemented by the governments of these countries.

The authors of the article studied the indicators of the countries of the European Union for this purpose that are landlocked and the countries of the former USSR which differ by scope of the total flows of fresh water.

Key words: fresh water, total flow of fresh water, water productivity, water supply for rural and urban populations, improvement of water resources management.

Introduction

Water is one of the most important natural resources on the Earth. The role and significance of water are conditioned by a number of circumstances, the most important of which are the following:

- ✓ Unlike many non-renewable resources (such as oil, gas, coal, slate, etc., which are mainly mineral fuel and energy resources), water is a renewable resource linked with a constant repeating hydrological cycle in nature. And if resources that do not recover over time are depleted, then water resources are not in such danger.
- ✓ Water resources are renewable, but this does not mean that their supplies and amounts are always stable in constant quantities. They are linked with processes in nature (in particular, climate warming which reduces or changes frequency and volume of precipitation) that affect the waters of the global ocean and the quality of the universal water circulation.
- ✓ Although the Earth is more like a water sphere than soil sphere, still only a small part of water resources which is fresh water, can be used to meet human needs (both economic and domestic). This fact especially emphasizes the importance of fresh water as population increases and the demand for fresh water also increases with the expansion of both the global and national economies. This means that the water resources of the planet Earth are not unlimited, they have their limits. Therefore, it is not accidentally that, according to some experts, the demand and supply of water in the world were equal in 2000. Now the demand for water exceeds its supply which increases the value of this resource. Note that in a market economy and in such an environment the cost of a resource is determined by its demand; the greater the demand, the higher the cost of both resource consumption and exchange (the cost at which the corresponding resource is acquired).

Problem statement and methodology

The authors aim to study fresh water resources, external flows, water productivity, as well as the state of water supply to the rural and urban population, especially in different unions of countries and in individual groups. The study was based on data and definitions published by the World Bank on freshwater and international and official publications in this area served as a methodological approach using comparative methods of averaging and grouping indicators of various groups and statistical series.

Study outcomes

If artificial surrogates are created (such as, for example, artificial rubber instead of natural rubber, etc.), in the case of using many natural resources, then artificial water has not been created yet. Thus, water as a consumption value has no alternative which makes this resource a unique, exceptional consumption value. It is noteworthy that the possibilities for water utilization are diminishing to a greater extent not because of the global economy and population growth, but because of the pollution of water resources and, as a result, deregulation of the economy. As a result, the ecological problem of water conservation and rational use is aggravated. It should be noted that in modern economics and in practice, not only the concept of economic capital is used, but the existence

of three closely related, interdependent types of capital - economic, socio-political and environmental - is also used for the well-being of human society [1, p. 24].

This circumstance, in particular, underlines the importance of water as a special commodity for all mankind in the sense that every citizen has an undistorted right to receive his own amount of drinking water. For this reason, two of the 17 Sustainable Development Goals [2] adopted by 193 member states at the UN Development Summit on September 25-27, 2015 (Clean water and sanitation, Life below water) are directly related to utilization and protection of water resources and the achievement of sustainable development goals, such as “no poverty”, “zero hunger”, “climate action” and other goals, is impossible without the conservation and utilization of water resources and for present and future generations, the creation of sufficient fresh water resources. In some regions of the world, due to the disproportionate socio-economic development of countries, there is a very disproportionate distribution of fresh water use both between individual regions and between states. This fact aggravates the contradictions between individual regions and states, especially in the use of transboundary water resources. This exacerbates the struggle for every cube meter of water. Already now (this problem will be more noteworthy in the near future), water has become a potential geopolitical factor that determines the opportunities for development of individual regions and countries. Certainly, we can also say that in the near future, the trade size of drinking water will increase significantly. It is a fact that meeting the drinking water needs of the population in some countries is very problematic; these countries are looking for various ways to solve the problem of drinking water supply, for example, from attempts to make the water of world oceans suitable for drinking to attempts to obtain drinking water as a result of wastewater treatment. It is sufficient to say that currently there are 16,000 desalination facilities in 177 countries around the world, thanks to which the waters of the World Ocean become suitable for drinking and economic activity. It is expected that the demand for the clean water obtained through desalination will rise to meet the needs of the population in those countries where sharp deficit of drinking water is observed. Governments of many countries consider the desalination a possible way to obtain drinking water. For instance, the governments of India and Israel signed a memorandum of cooperation to develop the desalination technologies in India. It is foreseen that this initiative to develop the technology will have a positive impact on the rise of drinking water market during the stated period of time [3].

Especially during the last 20-30 years, the largest volume of world trade in terms of value was observed in the export and import market for drinking water. It is sufficient to say that the volume of trade in drinking water exceeds the average volume of trade in other goods by 3-4 times. Moreover, the number of both exporting and importing countries engaged in the trade of drinking water is sharply increasing thus expanding their geography.

On the other hand, countries rich in drinking water resources can take advantage of the situation in the global market by making it an object of foreign trade, thereby increasing the range of export-oriented products.

From the perspective of expanding the possibilities of exporting drinking water from Armenia, one can imagine the events taking place in the world market and discuss the dynamics of consumption of bottled water in accordance with them. Along with the growth of urbanization and environmental pollution, today the problem of drinking water is becoming more acute all over the world as a result of which bottled water is becoming a popular commodity and its production - a profitable and promising business. Recently, competition in this part of the market is intensifying, new players are appearing which leads to an increase in the level of market saturation. However, the issue of exporting bottled water to the world market remains unresolved which is especially important in a rapidly changing situation on this market [4].

The growing interest in bottled water in the world is evidenced by the volume of consumption of bottled water compared to other beverages. In particular, according to statistics, in the largest market for bottled water in the United States over the past decade, the consumption of this product was in the second place among drinks, whereas only 10 years ago it was the 5th. Over the years, bottled water has surpassed beer, coffee and milk and is interior only to soft drinks. Thus, in 2000, the United States consumed 57 billion liters of soft drinks or 28% of all drinks, and this is when the consumption of bottled water is 9% or 18 billion liters. In 2008, the consumption of soft drinks dropped to 53 billion liters, while the consumption of bottled water, on the contrary, reached 33 billion liters (or about 15% of the total consumption of drinks) [4].

The world market for bottled water in 2020 is estimated at 217.66 billion US dollars, the average annual growth rate is projected in 2021-2028 to be 11.1% over the period. One of the guarantees of the rapid development of this market is the simplicity of supply, delivery to the consumer, minimal costs as well as simple ways of organizing.

By 2020 the global bottled water market consists of the following sectors in terms of products: 35% - desalinated (purified) water, 25% - mineral water, 15% - spring water, 12% - soda water, the rest - distilled water and water obtained by others ways. [3]

The countries of the Asia-Pacific region accounted for the largest share of the demand for drinking water in 2020 (over 42% of the market); these trends are projected to continue until 2028. This size of the regional market is mainly determined by the growing preference for bottled water by the population due to health problems and diseases caused by the consumption of contaminated water.

The leading manufacturers of bottled water on the world market, represented in different countries, are: Nestle, PepsiCo, Coca-Cola, Danone, Primo Water Corporation, FIJI Water Company etc. [3].

From the above mentioned point of view, the analysis of a number of indicators calculated by the World Bank, such as analysis of fresh water resources, utilization directions, water flows, water productivity (water use efficiency) and other indicators is of significant theoretical and practical interest.

Table 1 shows the main indicators of the utilization of fresh water and its resources in the largest regions of the world, as well as by groups of individual countries, distributed by income.

According to Table 1, the countries of Latin America and the Caribbean account for $32 \pm 2\%$ of the total freshwater runoff, East Asia - the Pacific Ocean - 23.5%, and Europe - Central Asia - $16 \pm 5\%$. It can be seen from the data in the table that the smallest flows of fresh water are in the Middle East and North Africa (only 0–5% of flows). This circumstance is especially important in the sense that the countries of the Middle East and North Africa are the least rich in water; the markets of these countries are most likely to export water from the Republic of Armenia. Notably, about half of the freshwater flows are in the upper middle income group and about $\frac{1}{4}$ in the high income countries. The Water Productivity Index (GDP per cubic meter of water produced, calculated in US dollars in 2010) is highest in high-income countries with the rate of 57 while in low- and middle-income countries the index is 4 which means that it is 14.2 times less than that of high-income countries.

The lowest level of access to basic drinking water services for rural populations was recorded in low-income countries (43.8% of the rural population) and in sub-Saharan Africa (45.7%). It is the lowest for the same groups (less than 90%) as well as the provision of drinking water for the urban population, respectively - 81.9% and 84.1%.

Table 1

Indicators of fresh water extraction and use by regions of the world and countries grouped by income level [5]

	Flows per billion cubic meter	Annual freshwater production					Water productivity, GDP / water use	Citizens using at least basic drinking water services	
		billion cubic meters	% of internal resources	For agriculture,%	for industry,%	for household purposes,%	2010, In US dollars per cubic meter	% of urban population	% of rural population
	2014	2014	2014	2015	2014	2015	2015	2018	2018
1	2	3	4	5	6	7	8	9	10
World	42,810.00	..	..	65	95	14	21	96.4	81.1
East Asia and Pacific region	10,106.10	..	..	64	22	14	18	97.5	85.9
1	2	3	4	5	6	7	8	9	10
Europe and Central Asia	7,070.90	..	4.9	41	96	13	48	98.9	96.6
Latin America and Caribbean	13,867.70	..	..	76	0	15	18	99.2	87.3
Middle East and North Africa	231.3	..	..	52	3	44	13	97	87.3
North America	5,668.00	..	..	..	..	..	40	99.8	97.2
South Asia	1,982.20	..	44.8	..	..	..	3	95.9	90.5
South Africa	3,883.80	..	..	73	2	25	14	84.1	45.7
Low-income countries	2,948.90	..	..	73	2	25	4	81.9	43.8
Middle-income countries	8,675.90	..	..	..	..	..	4	94	84.7
Middle-income countries	20,737.70	..	..	66	0	13	15	98.1	87.2
High-income countries	10,447.40	..	..	60	96	23	57	99.8	98.8

The source was compiled by the authors based on data from The World Bank. World Development Indicators, 19.07.2021. The electronic resource is available at <http://wdi.worldbank.org/table/3.5>.

We have classified all countries in the world by the size of their total freshwater flows in Table 2 (in billions of cubic meters). At the top of the list there are 10 countries with the highest freshwater flows, with Brazil, Russia and Canada in the third place and the countries with the lowest total freshwater flows at the bottom of the list: Maldives, Bahrain, Kuwait and Saint Kitts and Nevis. Interestingly, the flow rate of fresh water in the Maldives is zero, but in this country the water productivity is the highest among the countries in the table - 828 US dollars and the lowest in Myanmar - 2 US dollars which is in the 10th place in the “top ten” countries. Significant differences in water productivity are observed in the first three countries with the largest freshwater flows. In Brazil it is 35 US dollars, in the Russian Federation - 26 and in Canada - 52 US dollars. According to the data, among the top ten countries with the largest freshwater flows, the rural water supply is the lowest in Indonesia - 82% of the rural population and the highest - in Canada – 98.9%. In terms of the total freshwater flow shown in the table, the worst rates for urban and rural drinking water supply are absent in most countries, while Malta has 100% and Maldives 98.3% and 99.9%.

Classification of the best and worst countries in terms of total freshwater flows (billion cubic meters) [5]

	Flows per billion cubic meter	Annual freshwater production					Water productivity, GDP / water use	Citizens using at least basic drinking water services	
		billion cubic meters	% of internal resources	For agriculture,%	for industry,%	for household purposes,%	2010, In US dollars per cubic meter	% of urban population	% of rural population
	2014	2014	2014	2015	2014	2015	2015	2018	2018
Brazil	5,661.0	74.8	1.3	60	17	23	35	99.5	89.7
Russian Federation	4,312.0	61	1.4	..	..	..	26	98.6	92.6
Canada	2,850.0	38.8	1.4	12	80	14	52	99.6	98.9
USA	2,818.0	418.7	14.9	36	51	13	39	99.8	97
China	2,813.0	594.2	21.3	64	22	13	17	97.7	86.2
Colombia	2,145.0	11.8	0.5	54	19	27	27	99.9	86.4
Indonesia:	2,019.0	..	..	..	..	..	5	95.5	82
Peru:	1,641.0	13.6	0.8	89	2	9	12	95.6	75.6
India	1,446.0	647.5	44.8	90	2	7	4	96	91
Myanmar	1,003.0	..	..	..	..	..	2	93	76.9
Dominica	0.2	0	10	5	0	95	23	..	..
Grenada	0.2	0	7.1	15	0	85	60	..	..
United Arab Emirates	0.2	2.8	1,866.70	..	2	..	154	..	..
Barbados	0.1	0.1	87.5	..	8	..	66	..	..
St. Vincent and Grenadines	0.1	0	7.9	0	0	100	94	..	..
Malta:	0.1	0	44.4	64	2	34	307	100	100
Antigua and Barbuda	0.1	0	8.5	16	22	63	308	..	..
Qatar	0.1	0.2	387.5	..	2	..	700	..	..
Saint Kitts and Nevis	0	0	51.3	1	0	99	71	..	..
Kuwait	0	..	..	..	..	..	176	..	..
Bahrain	0	..	5,967.50	..	..	..	214	..	..
Maldives	0	0	15.7	0	5	95	828	98.3	99.9

The source was compiled by the authors based on data from The World Bank. World Development Indicators, 19.07.2021. The electronic resource is available at <http://wdi.worldbank.org/table/3.5>.

A description of the magnitude of fresh water flows in individual countries of the European Union, the efficiency of water use (water productivity), as well as the state of drinking water supply in rural and urban areas are given in Table 3. According to these data, the countries with the largest total freshwater flow are: France (200 billion cubic meters), Italy (182-5 billion cubic meters) and Sweden (171 billion cubic meters per hectare), Malta (0.1 billion cubic meters), Cyprus (0.8 billion cubic meters) and Luxembourg (1 billion cubic meters). The average water productivity index in the European Union was 186.5 US dollars. Among the countries of this group, the highest figure is in

Luxembourg - 1431US dollars, followed by Denmark - 492 US dollars, Ireland - 456 US dollars, and the lowest figure in Bulgaria - 10 US dollars, Estonia - 14 US dollars and Greece - 22 US dollars. Among the EU countries, the provision of the population with drinking water is almost 99-100%. Only the rural population of Lithuania is excluded, where the rate of drinking water supply for the rural population is 92.8%.

Table 3

Freshwater extraction and utilization indicators in EU countries [5]

	Flows per billion cubic meter	Annual freshwater production					Water productivity, GDP / water use	Citizens using at least basic drinking water services	
		billion cubic meters	% of internal resources	for agriculture, %	for industry, %	for household purposes, %	2010, In US dollars per cubic meter	% of urban population	% of rural population
	2014	2014	2014	2015	2014	2015	2015	2018	2018
Austria	55	3.5	6.3	2	77	21	124	100	100
Belgium	12	6	50	1	88	12	132	100	100
Bulgaria	21	5.6	27.2	15	69	16	10	99.5	98
Croatia	37.7	0.6	1.7	1	20	80	94	99.6	99.6
Cyprus	0.8	0.2	28.4	66	2	33	122	99.5	99.7
Czech	13.2	1.7	12.5	3	..	..	150	99.9	99.8
Denmark	6	0.6	10.6	25	20	55	492	100	100
Estonia	12.7	1.7	13.5	0	96	3	14	100	99.2
Finland	107	6.6	6.1	1	..	6	40	100	100
France	200	29.8	14.9	10	71	18	109	100	100
Germany	107	33	30.8	1	..	..	158	100	100
Greece	58	9.6	16.5	88	3	9	22	100	100
Hungary	6	5.1	84.2	6	79	14	35	100	100
Ireland	49	0.8	1.5	..	7	83	456	97	98.1
Italy	182.5	53.8	29.5	..	..	18	62	99.5	99.4
Latvia	16.9	0.2	1.4	15	21	64	166	98.8	98.2
Lithuania	15.5	0.6	4.1	10	66	24	185	99.8	92.8
Luxembourg	1	0	4.3	1	5	95	1,431	100	98.8
Malta	0.1	0	44.4	64	2	34	307	100	100
The Netherlands	11	10.7	97.5	1	88	11	116	100	100
Poland	53.6	11.5	21.4	10	..	..	60	99.8	99.5
Portugal	38	9.1	24.1	..	..	11	26	100	99.7
Romania	42.4	6.4	15.1	18	67	15	32	100	100
Slovakia	12.6	0.6	4.4	4	49	46	194	99.6	100
Slovenia	18.7	1.2	6.2	0	85	14	57	99.7	99.4
Spain	111.2	36.8	33	68	18	14	48	99.9	100
Sweden	171	2.7	1.6	4	58	38	243	100	100
The United Kingdom	145	8	5.5	13	14	71	337	100	100
Average for EU countries	53.7	8.8	21.3	17.1	45.7	32.2	186.5	99.7	99.4
EU countries only	1504.9	246.4	16.4	..	..	..	..	..	..

The source was compiled by the authors based on data from The World Bank. World Development Indicators, 19.07.2021. The electronic resource is available at <http://wdi.worldbank.org/table/3.5>.

As you know, there is a group of countries that are landlocked. [6] This circumstance has a noticeable impact on the economies of the countries belonging to this group, in the sense that these countries have higher transport costs for export-import transactions with goods and services. Consider the characteristics of total freshwater flows, water and drinking water productivity for rural and urban populations for a group of landlocked countries (Table 4). According to the table, Bolivia (303.5 billion cubic meters), Nepal (198.2 billion cubic meters) and Lao PDR (190 billion cubic meters) have the highest indicators of the total fresh water runoff in this group and the lowest – Andorra (0.3 billion cubic meters), the West Bank and Gaza (0.8 billion cubic meters), Luxembourg (1 billion cubic meters).

Table 4

Freshwater extraction and utilization indicators in landlocked countries [5]

	Flows per billion cubic meter	Annual freshwater production					Water productivity, GDP / water use	Citizens using at least basic drinking water services	
		billion cubic meters	% of internal resources	for agriculture, %	for industry, %	for household purposes, %	2010, In US dollars per cubic meter	% of urban population	% of rural population
	2014	2014	2014	2015	2014	2015	2015	2018	2018
1	2	3	4	5	6	7	8	9	10
Afghanistan	47.2	..	..	..	..	..	1	95.9	57.3
Andorra	0.3	..	..	..	..	..	..	100	100
Armenia	6.9	3.3	42.9	90	4	6	4	99.9	100
Austria	55	3.5	6.3	2	77	21	124	100	100
Azerbaijan	8.1	12	147.5	84	19	..	4	99.3	81.6
Belarus	34	1.5	4.5	32	32	36	43	96	98.3
Bhutan	78	0.3	0.4	94	1	5	7	98	96.7
Bolivia	303.5	2.1	0.7	92	2	7	13	99.4	78.1
Botswana	2.4	..	..	..	..	..	90	97.1	75.5
Burkina Faso	12.5	0.8	6.5	..	3	..	18	79.9	35
Burundi	10.1	..	..	..	..	..	8	89.8	56.6
Central African Republic	141	0.1	0.1	..	17	..	24	64.7	33.7
Chad	15	0.9	5.9	..	12	..	14	69.8	29.5
Czech Republic	13.2	1.7	12.5	3	..	..	150	99.9	99.8
Eswatini	2.6	..	..	..	..	..	5	96.8	60.4
Ethiopia	122	10.6	6.4	92	1	..	6	80.3	31.1
Hungary	6	5.1	84.2	6	79	14	35	100	100
Kazakhstan	64.4	20	31	66	30	4	9	98.1	92.3
Kirgizstan	48.9	7.7	15.8	93	4	3	1	97.1	82
Lao PDR	190.4	3.5	1.8	..	5	..	2	94.4	75.6
Lesotho	5.2	..	..	..	..	..	66	93	59.3
Liechtenstein	..	..	..	..	..	..	..	..	..
Luxembourg	1	0	4.3	1	5	95	1,431	100	98.8
Northern Macedonia	5.4	0.6	10.2	23	36	41	11	90.6	96.6
Malawi	16.1	1.4	8.4	..	4	..	7	85.8	65.4
Mali	60	5.2	8.6	98	0	2	3	92.2	68.3
Moldova	1.6	1.1	65.7	3	83	14	11	97	83.2
Mongolia	34.8	0.6	1.6	44	43	13	27	96	55.9

1	2	3	4	5	6	7	8	9	10
Nepal	198.2	9.5	4.8	98	0	2	2	89.1	88.7
Niger	3.5	1	28.1	..	3	..	7	84.3	43.6
Paraguay	117	2.4	2.1	79	6	15	15	99.9	99.2
Rwanda	9.5	..	..	..	..	..	52	82.2	52.6
Serbia	8.4	4.2	49.4	3	..	..	9	83.3	88.4
Slovakia	12.6	0.6	4.4	4	49	46	194	99.6	100
South Sudan	26	0.7	2.5	36	34	29	11	64.8	34.9
San Marino	..	..	..	..	..	..	..	..	..
Switzerland	40.4	2	5	8	32	60	379	100	100
Tajikistan	63.5	11.2	17.6	91	4	6	1	96.2	75.6
Turkmenistan	1.4	..	1,983.6	..	..	..	2	100	97.6
Uganda	39	0.6	1.6	41	8	51	59	75.1	41.3
Uzbekistan	16.3	49.2	300.9	..	3	..	1	99.6	96.1
West Bank and Gaza Strip	0.8	0.4	50.2	..	7	..	..	97.1	95.9
Zambia	80.2	..	..	..	..	..	18	83.9	42
Zimbabwe	12.3	3.6	29.1	82	6	12	5	94	49.8
Average for landlocked countries	45.6	5.1	86.6	50.6	19.6	23.0	71.7	91.9	74.2
Landlocked countries only	1914.7	167.4	8.7	..	..	..	..	..	..

The source was compiled by the authors based on data from The World Bank. World Development Indicators, 19.07.2021. The electronic resource is available at <http://wdi.worldbank.org/table/3.5>.

Among the countries in this group, Luxembourg (USD 1431) again leads with the highest water productivity index, followed by Switzerland (USD 379), Slovakia (USD 194) and the worst indicators of productivity are in Afghanistan, Kirgizstan and Tajikistan where it is 1 US dollar. It should be noted that the average of fresh water flow in landlocked countries amounted to 45.6 billion cubic meters, which is 15.1% less than the corresponding indicator of the European Union (53.7 billion cubic meters). However, the average water productivity index was \$ 71.7, which is 260% lower than the corresponding indicator for the EU countries (\$ 186.5). This means that in the group of landlocked countries compared to the EU countries, fresh water is used with very low efficiency. For countries in this group, the availability of drinking water for the urban population is quite good, but the same cannot be said for the rural population, where there are countries whose rural water supply is less than 40% (Chad, Ethiopia, Central African Republic, Burkina Faso and South Sudan). A study of fresh water resources and their use in the former Soviet Union shows (Table 5) that the total fresh water flow in this group of countries is highest in the Russian Federation, where it is 4312.0 billion cubic meters, followed by Kazakhstan - 64.4 billion cubic meters and in Tajikistan 63.5 billion cubic meters. The countries with the lowest total consumption of fresh water include Turkmenistan - 1.4 billion cubic meters, Moldova - 1.6 billion cubic meters and Armenia - 6.9 billion cubic meters of water.

In this group of countries, the highest water productivity indices have been recorded in Lithuania (185 USD), Latvia (166 USD), Belarus (43 USD), while the lowest indices have been recorded in Kirgizstan, Tajikistan and Uzbekistan (1 each USD). The average level of water productivity in the former Soviet republics was 32.7 \$, which, for example, is about 6 times lower than the average level of water productivity in the EU countries. As for the index of access to drinking water services for urban and rural population of the former Soviet Union countries, it is not lower than the corresponding indices for EU countries.

Table 5

Freshwater production and use indicators in the former Soviet Union countries [5]

	Flows per billion cubic meter	Annual freshwater production					Water productivity, GDP / water use	Citizens using at least basic drinking water services	
		billion cubic meters	% of internal resources	For agriculture, %	for industry, %	for household purposes, %		2010, In US dollars per cubic meter	% of urban population	% of rural population
	2014	2014	2014	2015	2014	2015	2015	2018	2018
Armenia	6.9	3.3	42.9	90	4	6	4	99.9	100
Azerbaijan	8.1	12	147.5	84	19	..	4	99.3	81.6
Belarus	34.0	1.5	4.5	32	32	36	43	96.0	98.3
Estonia	12.7	1.7	13.5	0	96	3	14	100	99.2
Georgia	58.1	1.8	3.1	..	22	..	9	100	96.2
Kazakhstan	64.4	20	31	66	30	4	9	98.1	92.3
Kyrgyzstan	48.9	7.7	15.8	93	4	3	1	97.1	82.0
Latvia	16.9	0.2	1.4	15	21	64	166	98.8	98.2
Lithuania	15.5	0.6	4.1	10	66	24	185	99.8	92.8
Moldova	1.6	1.1	65.7	3	83	14	11	97.0	83.2
Russian Federation	4,312.0	61	1.4	..	..	..	26	98.6	92.6
Tajikistan	63.5	11.2	17.6	91	4	6	1	96.2	75.6
Turkmenistan	1.4	..	1,983.6	..	..	..	2	100	97.6
Ukraine	55.1	14.9	27	30	48	22	15	91.3	99.4
Uzbekistan	16.3	49.2	300.9	..	3	..	1	99.6	96.1
Average for former USSR countries	314.4	13.3	177.3	46.7	33.2	18.2	32.7	98.1	92.3
Only the countries of the former USSR	4715.4	186.2	3.9	..	..	..	..	..	..

The source was compiled by the authors based on data from The World Bank. World Development Indicators, 19.07.2021. The electronic resource is available at <http://wdi.worldbank.org/table/3.5>.

Conclusion

Study of freshwater production, flow, ways of utilization and efficiency, urban and rural water service indices and study of data from groups of different countries (countries distributed by income, countries with lowest and highest total flows, landlocked EU and former Soviet Union countries) and individual countries show that very often the water productivity index does not directly depend on the total flow of fresh water, the value of which mainly depends on the way the economy is managed and depends on the efficiency of the government work. At the same time, there is a need to significantly improve the efficiency of water use both in certain regions and groups and in individual countries, since it becomes the only possible available means of meeting the growing needs of both the population and the economy. All this presupposes the use of legislative, organizational, economic and innovative structures and mechanisms in the process of management of freshwater resources.

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ՔԱՂՏՐԱՀԱՄ ԶՐԻ ՊԱՇԱՐՆԵՐԸ ԵՎ ԴԻԱՆՑ ՕԳՏԱԳՈՐԾՄԱՆ ՀԻՄՆԱԿԱՆ ՑՈՒՑԱՆԻՇՆԵՐԸ ԱՇԽԱՐՀՈՒՄ

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Քաղցրահամ ջուրը Երկիր մոլորակի կարևորագույն բնական ռեսուրսներից է, որն անհրաժեշտ է մարդու և նրա տնտեսական գործունեության իրականացման համար և, ի տարբերություն բազմաթիվ այլ ռեսուրսների, չունի այլընտրանք: Այս հանգամանքը քաղցրահամ ջուրը դարձնում է, թերևս, մարդկության կենսակերպը ինչպես ներկայում, այնպես էլ ապագայում կանխորոշող կարևորագույն բնական և անփոխարինելի գործոն: Համաշխարհային օվկիանոսի ջրերի աղտոտման, ինչպես նաև կլիմայի տաքացման պատճառով, մի կողմից, և մոլորակի բնակչության թվաքանակի աճի և համաշխարհային տնտեսության մասշտաբների ավելացման հետևանքով, մյուս կողմից, մեծացել է քաղցրահամ ջրի պահանջարկը ինչպես առանձին տարածաշրջաններում, այնպես էլ կոնկրետ երկրներում: Այս ամենով հանդերձ ներկայումս երկրների առանձին տնտեսական միություններում և խմբավորումներում ստեղծվել են ինչպես ջրի արտադրողականության, այնպես էլ գյուղական ու քաղաքային բնակչության ջրամատակարարման միմյանցից տարբերվող իրավիճակներ: Քաղցրահամ ջրերի վերաբերյալ

Համաշխարհային բանկի կողմից ձևավորված ցուցանիշների միջերկրային և տնտեսական միությունների ու խմբավորումների համեմատությունը վկայում է դրանցում տեղ գտած թերությունների մասին, որոնց չեզոքացումը առաջիկայում պետք է դառնա այդ երկրների կառավարությունների կողմից ջրային ռեսուրսների կառավարման բարելավման առարկան: Այդ նպատակով հեղինակներն ուսումնասիրել են քաղցրահամ ջրերի ընդհանուր հոսքերի չափերով տարբերվող, Եվրամիության, դեպի ծով ելք չունեցող երկրների, նախկին ԽՍՀՄ երկրների ցուցանիշները:

Բանալի բաներ. քաղցրահամ ջուր, քաղցրահամ ջրի ընդհանուր հոսք, ջրի արտադրողականություն, գյուղական և քաղաքային բնակչության ջրամատակարարում, ջրային ոլորտի կառավարման բարելավում:

ЗАПАСЫ ПРЕСНОЙ ВОДЫ И ОСНОВНЫЕ ПОКАЗАТЕЛИ ИХ ИСПОЛЬЗОВАНИЯ В МИРЕ

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Пресная вода - один из важнейших природных ресурсов на планете Земля, который необходим человеку для осуществления своей хозяйственной деятельности и, в отличие от многих других ресурсов, не имеет альтернативы. Это обстоятельство делает пресную воду, пожалуй, важнейшим незаменимым природным ресурсом, определяющим образ жизни человечества как в настоящем, так и в будущем. Из-за загрязнения вод Мирового океана, а также потепления климата, с одной стороны, и роста численности населения планеты и увеличения масштабов мировой экономики, с другой стороны, возрос спрос на пресную воду как в отдельных регионах, так и в конкретных странах.

Вместе с тем, в настоящее время в отдельных экономических союзах и группировках стран возникли отличающиеся друг от друга ситуации с продуктивностью воды и с водоснабжением сельского и городского населения.

Сравнение сформированных Всемирным банком показателей по пресной воде средиземноморских экономических союзов и группировок свидетельствует о недостатках, устранение которых в ближайшее время должно стать предметом улучшения управления водными ресурсами со стороны правительств этих стран.

С этой целью авторы статьи изучили показатели стран Евросоюза, не имеющих выхода к морю и стран бывшего СССР, различающихся по величине общих потоков пресной воды.

Ключевые слова: пресная вода, общий поток пресной воды, продуктивность воды, водоснабжение сельского и городского населения, улучшение управления водными ресурсами.

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