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WATER RESERVOS IN NAMANGAN REGION AND ISSUES OF THEIR EFFICIENT USE

Abstract: *This article focuses on the issues of reservoirs located in the Namangan region, their current state and more efficient use. Initially, data on the hydrological and hydraulic engineering indicators of the region's existing reservoirs were analyzed. In addition, the article discusses the possibilities of further increasing the volume of water in the Rezaksai and Eskiersk reservoirs. In particular, based on the results of field research and work with large-scale maps, the current water capacity of the Rezaksai reservoir is estimated to be possible to increase to 500 million m³.*

Keywords: *Namangan region, reservoirs, water resources, reservoir volume, Eskier reservoir, Rezaksai reservoir.*

Introduction. It is well known that the volume of water in rivers varies seasonally throughout the year as well as from one year to another. Under the conditions of our region, during periods when the demand for water in agriculture increases, water resources in many rivers and streams decline sharply and, in some cases, may even dry up completely. In such circumstances, in order to ensure the full and efficient utilization of river and stream waters, it becomes necessary to regulate their flow regime. This problem is addressed through the construction of artificial lakes and reservoirs on rivers [5,6].

The construction of reservoirs is particularly important in arid regions such as our country, where agriculture is largely dependent on irrigation. In addition to providing irrigation water for agricultural lands, reservoirs are also designed to support hydropower generation, fisheries development, and the improvement of water supply for large industrial enterprises and urban centers.

It is known that since the 1950s irrigated agriculture in the Republic has developed at an unprecedented rate, and thousands of hectares of virgin and unused lands were brought under cultivation. At the same time, major industrial centers such as Chirchik, Angren, Bekobod, Olmalik, and Navoiy were established and expanded. As a result, the demand for water resources increased significantly. Consequently, extensive construction of reservoirs on the rivers of Uzbekistan was initiated. Among them, the Quyimozor Reservoir in the Zarafshan foothills, Chimqo‘rg‘on Reservoir on the Qashqadaryo River, South Surxon Reservoir and Uchqizil Reservoir on the Surxondaryo River, and the Tuyabo‘g‘iz Reservoir on the Ohangaron River

were constructed and put into operation. During the 1960s, the Chorbog‘ Reservoir on the Chirchiq River, the Turk Reservoir on the Ohangaron River, and the Tolimarjon Reservoir in the Qashqadaryo Basin were established. By the 1970s, large-scale reservoirs such as the Andijan Reservoir on the Qoradaryo River and the Tuyamo‘yin Reservoir on the Amudarya River had also been constructed.

Literature review. Research devoted to the study of reservoirs has been conducted by a number of foreign scholars, including George Evelyn Hutchinson, Glen Harbeck, R. Jackson, R. Martin, J. Willis, H. Varlet, and N. Thomas. Among the scholars of the former Soviet Union and CIS countries who investigated these issues are V.G. Glushkov, G.I. Shamov, A.V. Karaushev, Ashot B. Avakyan, V.M. Shirokov, S.L. Vendrov, B.B. Bogoslovskiy, I.A. Shiklomanov, Y.M. Matarzin, V.A. Sharapov, and K.K. Edelshteyn.

In Uzbekistan, the first studies related to reservoirs were carried out by V.L. Shults, O.P. Sheglova, F.E. Rubinova, Y.N. Ivanov, A.M. Nikitin, A.R. Rasulov, and others. At present, among the studies dedicated to this issue, the works of N.Y. Gorelkin, Y.M. Vidineeva, Z.S. Sirliboyeva, D.P. Aytbayev, E.I. Chembarisov, F. Xikmatov, F.Y. Artikova, B.Y. Adenbayev, G‘.X. Yunusov, F.A. Gapparov, D.M. Turg‘unov, and M.R. Ikromova occupy a significant place.

In the book “Водохранилища мира” (“Reservoirs of the World”) authored by Ashot B. Avakyan, valuable information is presented concerning the types of reservoirs around the world and their principal characteristics. The monograph extensively discusses issues related to the construction and utilization of reservoirs, as well as their environmental impacts. Furthermore, it provides comprehensive information on the global distribution of reservoirs, their distinctive features, and their classification according to various characteristics. In terms of the breadth of coverage and analysis of reservoir-related problems across different countries, this work represents the first comprehensive monograph in Russian scientific literature devoted to the subject [1].

Research methodology. In this article, methods such as geographical generalization, geographical analogy and comparison, as well as modern hydrological calculation techniques were employed. In addition, modern Geographic Information Systems (GIS) were utilized in the study of the storage capacities of reservoirs in the Namangan Region. Field investigations aimed at improving the efficiency of water resource utilization in the existing reservoirs of the region were conducted using water-engineering and hydrotechnical survey methods.

Results and their analysis. Following the construction of reservoirs, a substantial volume of water is required for their initial filling. This, in turn, exerts a certain influence on the water reserves of the region where the reservoirs are located. It should also be emphasized that

the water used to fill the useful (regulated) storage capacity of a reservoir is temporary in nature, since it can subsequently be utilized whenever necessary. In contrast, the water expended in filling the dead storage capacity cannot be effectively reused in the same manner.

At present, numerous large and small reservoirs are operating in the Namangan Region. These reservoirs occupy an important place among the region's water bodies and provide essential services to various sectors of the regional economy (Table 1).

Table 1

Reservoirs in Namangan region

№	**Reservoir name**	**Reservoir type**	**River basin**
1	Karasuv	In the riverbed	Isfarand-Shavand
2	Eskiyer	Drainage	Namangansoy
3	Jiydalisoy	Drainage	Chadoqsoy
4	Zarkent	Drainage	Pochchaotasoy
5	Rezaksoy	Drainage, floodplain	KNK, Rezaksoy
6	Koksaraksoy	Drainage	Koksaraksoy
7	Varzik	Drainage	Govasoy
8	Qaramurda	In the riverbed	Khoja-Sho'kent
9	Shursuv	In the riverbed	Achchisuv
10	Kosonsoy	Drainage, floodplain	Kosonsoy
11	Chortoq	Drainage	Chortoqsoy
12	Yertikon	In the riverbed	Girvonsoy
13	Girvonsoy	Drainage	Girvonsoy
14	Kengkol	Drainage	Kengkulsoy
15	Kandien	Drainage	Kandiensoy
16	Kokand	Drainage	Namangansoy
17	Beshtol	Drainage	Beshtolsoy
18	Sassiqsoy	In the riverbed	Sassiqsoy

At each reservoir, specialized observations are carried out by the staff of the Hydrometeorological Service and the Ministry of Water Resources of the respective country in whose territory the reservoir is located. These observations are conducted with the aim of studying the water level regime, hydrobiology, hydrochemistry, hydrophysics, and hydrodynamics of reservoirs. At present, the accumulated observational data are sufficient to reveal the principal закономерности (regularities) characteristic of reservoirs.

Among the reservoirs presented in the above table, the Eskiyer Reservoir stands out due to its large size and abundance of water resources. In this study, the reservoir was investigated through direct field observations.

Eskiyer Reservoir – he Eskiyer Reservoir is one of the important hydraulic engineering structures located in the Namangan Region. It plays a significant role in the regional water management system, particularly in agricultural irrigation, maintaining ecological stability, and regulating water resources. The reservoir is of great importance in supplying irrigation water to the surrounding agricultural lands. Furthermore, since this hydraulic structure is situated in a mountainous area, it also serves to reduce the risk of floods and mudflows. The water of the reservoir is additionally used by the local population for domestic and livestock-related needs.

At the Eskiyer Reservoir, the high-water period is observed during late winter, particularly in February, and continues until the middle of March in the spring season. During our field visit to the reservoir on March 11, 2025, the total water volume amounted to 13.7 million m^3. Observations revealed that the lands surrounding the reservoir have been affected by soil salinization. At present, the waters of the Eskiyer Reservoir are utilized for irrigating agricultural lands in the districts of Chortoq, Yangiqo‘rg‘on, and Namangan.

In addition, the article also examines the Rezaksoy Reservoir.

Rezaksoy Reservoir – The Rezaksoy Reservoir is located within the widened section of the Rezaksoy Valley. The valley represents a broad depression bounded to the west and east by foothill ridges with relative elevations ranging from 100 to 150 meters. The total water storage capacity of this geomorphological depression is estimated at 600–700 million m^3. The Rezaksoy River originates within the territory of Kyrgyzstan, on the eastern slopes of the Kugali mountain range, at an elevation of approximately 3,700 meters.

During the summer season, the river dries up in its lower course between the villages of Kaqlikqo‘rg‘on and Rezak, whereas in the upper reaches the water flow remains perennial. The results of investigations into the relief conditions of the reservoir areas indicate the existence of opportunities to increase their storage capacities. In particular, while the present storage capacity of the Rezaksoy Reservoir amounts to 200 million m^3, there is potential for expanding it up to 500 million m^3 in the future. Field investigations and analyses of large-scale topographic maps revealed that the total volume of the geomorphological depression reaches approximately 600–700 million m^3.

Conclusion. Based on the results of the above-mentioned research, the following conclusions may be drawn:

It is recommended to further expand the modernization, cleaning, reinforcement, and automation of hydraulic structures at the reservoirs of the Namangan Region. In addition, it is

necessary to establish a sustainable year-round water storage management system for these reservoirs.

In the irrigated agricultural areas supplied by the reservoir water resources of the Namangan Region, the use of traditional irrigation methods should be reduced. Instead, modern irrigation approaches, particularly water-saving technologies, should be more widely implemented throughout these territories.

The storage capacities of the Rezaksoy Reservoir, Kengko‘lsoy Reservoir, Yozyovon Reservoir, Karkidon Reservoir, and Jizzakh Reservoir, which are replenished by the water resources of the Syr Darya River and Naryn River, should be increased to a safe level while taking into account the geomorphological and relief conditions of the area. Increasing the storage capacity of the Rezaksoy Reservoir alone would add approximately 250–300 million m³ of water to the country’s vegetation-period water reserves.

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