

Hydrographical Research in Turkestan in the Beginning of XX Century

S. Khakimova¹

¹ Doctoral student of Fergana state university, PhD

Abstract:

The article, based on archival data and primary sources, analyzes the hydrographic work carried out on the rivers of the Turkestan at the beginning of the 20th century. The author defines the main goals of these works, and also shows the features of hydrographic work on a certain river. The practical significance of hydrographic work for the economy of the region is revealed.

Keywords: hydrography, Amudarya, Syrdarya, Zeravshan, Chirchik, E.Oldekop.

Introduction. At the beginning of the 20th century, the goals of hydrographic research in Turkestan changed somewhat compared to the previous period. Now it was necessary to make full use of the land and water resources of conquered Turkestan, to plant as many agricultural products as possible in the country, especially the further expansion of cotton cultivation, in addition, it was necessary to increase the area of irrigated land for Russian peasants resettled from the interior regions of the empire.

For this reason, hydrographic studies of this period were carried out to determine the possibility of creating new canals for irrigation, hydraulic structures (reservoirs, water distributors), hydrogeological study of river basins and identifying territories that could be developed.

Discussion and results. Research in the early 20th century was primarily conducted by the Land Improvement Department. In particular, in 1910-1917, reconnaissance parties of the Department conducted research in the Amu Darya basin. In 1910-1912, in the area from Chardzhuy to the Amu Darya delta, 27 strong points were established and leveled, a survey of the area was carried out, and a plan of the Amu Darya section from Chardzhuy to Pitnak was drawn up and published. During this period, an area of 2,788 square versts was leveled, and 116 thousand rubles were spent on scientific research [11].

In 1913-1917 research on the Amu Darya was continued under the leadership of V.Sinzerling. As a result of the research, several large canals of the Khiva Khanate were explored , such as Lavzan, Kilich-Niyazbiy, Shakhmurat at a total distance of 300 versts. In the Amu Darya basin in the area of Dzhumurtag, Kipchak, Takhiyatash, changes in the river bed and its hydraulic properties were studied. A survey of empty land around the river was also carried out. At this stage of research, 185,000 rubles were spent [11]. The main goal of these studies was to reorganize the local irrigation system, create new hydraulic structures and determine the possibilities of irrigating empty lands.

At the beginning of the 20th century, research in the Syrdarya basin was mainly related to determining water consumption for newly developed lands, efficient use of water for irrigation and construction of reservoirs. In particular, the construction of a main canal here with the aim of developing empty lands in Mirzachul required additional research of the river bed and basin.

In 1902, engineers Rudinsky and Grinup carried out leveling and measuring work in the Syrdarya valley near the Irzhar crossing. Leveling was carried out along the left bank, and the depth of the river was measured every 5 fathoms. An advance of 200 rubles was allocated for the research [1].

In 1910, after the creation of the Hydrometric Unit, 5 hydrometric stations were created on the Syrdarya River, of which the Zaporozhye station, located near the Khilkovo railway station, at the river's exit from the Fergana Valley, was important. Here it was possible to measure the volume of water in the Syr Darya before the Chirchik River flows into it and to design large irrigation structures that were planned to be built in Mirzachul [6].

The work of the Hydrometric Unit in the Syrdarya basin began in 1912 and was carried out by five reconnaissance detachments. They were led by G.K.Riesenkampf, I.A.Shovgenov, N.E.Epanchin, I.G.Alexandrov and P.V.Rogalevich [13]. One of the tasks assigned to the Fergana reconnaissance detachment was to study the regime of the main rivers of the valley [9]. Engineering and hydrological studies were carried out by these groups throughout the Syrdarya, as well as the Kara Darya, Naryn, Chirchik, Arys and other rivers of the basin.

In addition to the available water resources for irrigation of new lands in the Syrdarya and Fergana regions, hydrogeological studies were carried out to determine groundwater. In particular, in 1913, empty lands were explored in the Margilan district in the basins of Aravan, Isfayramsay, Shakhimardonsay, Sokh and Isfara, as well as on the right bank of the Syrdarya from Akhsi-Shakhand downstream to the border of the region [2]. As a result of such research, projects were developed for the use of Syrdarya waters during the development of Mirzachul.

By this time, navigation along the Syrdarya was used only for the transportation of goods, but in 1913 N.Benselevich studied the suitability of the Syrdarya for shipping. In his report, he gives a hydrographic description of the rivers that form the Syr Darya and their tributaries. It is based on the results of measurements carried out in 1899-1911 at a post near Khojent to determine the volume of water in the Syr Darya. According to him, the least amount of water in the Syrdarya was in 1904, and the greatest in 1908. Compared to the Amu Darya, the volume of water in the Syrdarya was 4 times less. It is noted that stones and bricks sunk for the construction of a dam on the banks of Bekabad may prevent ships from passing along the entire course.

At the same time, N. Benselevich points out other reasons that impede the movement of ships. In particular, according to his observations, there were few large trade and production centers along the Syrdarya River, and it flowed mainly through the steppe regions. From the places where there are such centers, a railway was laid parallel to the river. Fishing in the river was also not established on an industrial scale. These factors did not necessitate the use of the Syr Darya as a trade route. The researcher says exploitation of Mirzachul for cotton cultivation will have a negative impact on the volume of water in the river, and this will impede the movement of ships. Also, the fact that transporting cotton by rail is more economical than by river also leads to the conclusion that creating a waterway along the Syr Darya is impractical [4].

In 1907, a water distributor project was considered, which was planned to be built at the site where the Zarafshan River divides into Akdarya and Karadarya. The compliance of the project with its purpose, the natural conditions of the Zarafshan River, the quality of the soil in its bed, and the economic significance of this structure are emphasized. By installing a water distributor, it was possible to save up to 10,000 rubles annually, which would have been spent on manual labor. However, it was said that information on a number of river characteristics was insufficient to implement the project. In particular, it is noted that the limits of fluctuations in the river level and the height of the foundation of the water distributor are not known, the drawings and strength of the banks have not been calculated, which complicates the construction of the water distributor [3]. It was obvious that more research was needed to solve the above problems.

In 1913-1916, under the leadership of the Turkestan Water Administration, the Zeravshan group of the Hydrometric Unit, led by engineer A.V. Chaplygin, conducted research in the river basin. Based on observations, it has been established that the volume of water in the Zarafshan River depends on the air temperature, that is, as the temperature rises, the water flow also increases. Also, taking into account the similarity of the properties of the sources of Zarafshan and Amu Darya, it was possible to calculate the volume of water flow in Zarafshan by comparing the results of measurement work carried out on the Amu Darya.

It has been established that the volume of water in Zarafshan decreases by 20% every 7-8 years, and this, in turn, requires a reduction in the size of agriculture [12]. At the same time, cases of floods and excess water flow into the ancient bed of the Makhandarya River were observed from time to time as a result of rising levels of the Zarafshan River. In particular, according to the participants of the Makhandarya expedition, which operated in the 50s and 60s of the 20th century, such an event was observed in the 70s of the 19th century and in the 1896, 1900, 1909, 1923, 1944 [5]. As a result, the lakes located at the foot of Makhandarya were filled with water, and the residents for some time were engaged in farming in this area.

Although A. Chaplygin was unable to complete his observations for political reasons, several years of observations on Zarafshan supplemented information about river flow, water consumption, additional water sources, and expanded ideas about the hydrological regime of the river.

In 1908, the water in the Surkhan River rose and washed away several Russian buildings in the Termez fortress. Since the river forms a bend at this point, the village of Pattakesar and its surrounding fields were under threat of flooding. Also, the waters of the river could flood and destroy the main main canal of Termez. In this regard, military engineer A.G. Ananyev proposes a plan for straightening the bed of the Surkhan River from this place to the Amu Darya. To do this, it was necessary to block the old river bed with a dam and divert the water into the left tributary, up to 10 fathoms wide. The ruler of Shirabad sends 600 workers to build the dam. Under the leadership of A.G. Ananyev, a temporary and then a permanent dam was built. However, the increasing influx of water in Surkhan requires that excess water be directed to the Amu Darya by digging a canal. A.G. Ananyev studied the banks and identified a suitable place for this, 600 fathoms above the Russian barracks. Residents of Joyi Changin village protested against the start of the work as the canal had to be dug instead of crops belonging to the villagers. Digging of the canal began after the authorities of Bukhara promised to allocate land to them in another place. As a result, part of the river bed at a distance of 5 versts was straightened. Thanks to this, the Russian barracks and the surrounding villages, as well as 1,500 acres of cultivated land, were freed from the danger of flooding [7].

Research for the construction of reservoirs in the upper reaches of the Syrdarya covered the basins of the Chirchik and Karadarya rivers. In this regard, the Chirchik River was studied from the point of view of determining the optimal location for the construction of a reservoir. For this purpose, the river was reconnaissance from Tashkent to a gorge located 7-8 km above the village of Burchmulla.

Considering that the Chirchik River narrows in the upper reaches and flows between high mountains, and above this place the Chatkal and Pskem rivers flow into it, large volumes of oil production, as well as the relatively small slope of the river, it was concluded that it is possible to build a reservoir at a distance between Burchmulla and Khojakent [8]. The amount of suspended sediment in the river, which could affect the rise of the bottom of the reservoir, was also studied.

In 1913, after V. Glushkov left the post of head of the Hydrometric Unit, his place was taken by the prominent hydrologist and meteorologist E. Oldekop. He began to study the dependence of the hydrological regime of the Chirchik River on meteorological conditions. His research served as the basis for determining the significant influence of climate and precipitation on the water regime of not only Chirchik, but also the rivers of Central Asia as a whole, as well as for the development of hydrological forecasts. Also, E. Oldekop created a hydrographic map of the Chirchik River [10].

Conclusion. Thus, having examined the hydrographic work carried out in Turkestan by specialists of the Hydrometric Unit, we can conclude, that these surveys were carried out for the wider development of the irrigated lands of the region by the Russian Empire. The possibilities of constructing reservoirs in the upper reaches of rivers were also studied. For this purpose, information about water flow was collected. In addition, E. Oldekop's research served to determine water flow in Central Asian rivers, and the methods he developed were subsequently improved.

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