

REGARDING 3 WATER SOURCES OF KASHKADARYA

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ABSTRACT

The provided information focuses on the irrigation systems and water sources in the Kashkadarya and Zarafshan regions of Uzbekistan. It includes detailed descriptions of various rivers, their water flows, and the irrigation channels that distribute water to the farmlands in the respective areas. The text highlights the crucial role of these water sources in supporting agriculture and sustaining livelihoods in the region. The annotation provides a comprehensive overview of the region's water management strategies, which are vital for understanding the agricultural practices and water availability in the area.

KEYWORDS

Nile River, Tigris, Euphrates, Yangtze, Huanghe, Indus, Zarafshan, Kashkadarya, Syrdarya, Amudarya, Jinni River, Oxus River, Tanzhuz River, Yakkabog River, Gyzylsu River, Langar River.

INTRODUCTION

In the history of world civilizations, the development and prosperity of ancient civilizations have always been closely associated with the vital component of nature - water resources. Specifically, the emergence of ancient civilizations such as Egypt in the basin of the Nile River during the 4th and 3rd millennia BCE, Mesopotamia in the basins of the Tigris and Euphrates Rivers, ancient India in the basins of the Ganges and Indus Rivers, and the ancient Chinese civilizations in the basins of the Huanghe and Yangtze Rivers, stands as undeniable evidence of this fact. Alongside the birth of

ancient urban civilizations, the establishment of complex water supply systems and hydraulic structures has been a fundamental factor contributing to their development, providing the basis for studying the history of water management, investigating changes in these systems over time, and identifying their impact during different historical periods - one of the essential directions of research in world historiography.

In various scientific research centers around the world, studies focusing on the Sogdiana region, formed



within the basins of the Zarafshan and Kashkadarya Rivers, have been conducted to explore the emergence of ancient agricultural civilizations, the history of water management, urbanization, craftsmanship, and socio-economic issues. During these scholarly investigations, all the cities and large rural settlements of Sogdiana, belonging to the ancient and medieval periods, have been identified, along with the natural and artificial water basins in which they are situated. Understanding their history and material culture provides a unique opportunity to shed light on the issues related to the emergence of agricultural civilization in particular water-rich agricultural societies.

Kashkadarya river is located in the north-western part of the Zarafshan river system and in the south-western part of the Hisor river system. In the formation of the river, rivers, mountain streams, and seasonal snowmelt and rainwater play a significant role. The Kashkadarya river starts from the south-western part of the Hisor river system. Its highest point is at an altitude of 4145 meters. The total area of the river is 310 kilometers wide and it flows into the Karshi depression, forming terraces 1-5 of Kashkadarya. These terraces are formed by quaternary alluvial and proluvial sediments.[1,62] The Kashkadarya river varies in width at different places, sometimes narrow and sometimes wide, forming a V-shape. Its banks, in many areas, are quite steep, with heights ranging from 50 meters to 120 meters.

The regions of Maymoqtoq, Kosontoq, Aloviddintoq, and Qonqirtoqlar are also located within this river area. The distribution of vegetation varies depending on the height above sea level. At the banks of the river, the annual precipitation reaches 450-500 mm, while in the plateau area, it is around 150-200 mm. The majority of precipitation occurs during the spring, summer, and autumn seasons. The Kashkadarya river is the main

source of water flowing from the north-east to the south-west. In some places, the river is wide and calm, while in others, it flows rapidly.[2,17-21] The irrigation map of Kashkadarya region (1974), (Figure 1).

In the upper reaches of the Kashkadarya river, there are no major rivers flowing from high altitudes. Small streams bring water from the foothills of the Quratepa ridge to the river. Due to the relatively low elevation of the Quratepa ridge, the amount of water flowing from these existing streams is quite limited. Large and small streams coming from the highlands merge into four basins and flow into the river. These basins are known as the Kalqamasoy, Shorobsay, Makridsoy, and Oyqchisoy. During the spring season, the water from these streams significantly contributes to the flow of the Kashkadarya river. In dry periods, the water from the streams may not even reach the Kashkadarya.

The water inflow areas of the Oqsuvdarya, Tanhozdarya, and Qizildarya are located at higher elevations; therefore, they belong to the river's basin and the type of rivers fed from snow and glaciers. Hence, these rivers are part of the main water sources of the Kashkadarya basin.

The Kashkadarya, Shahrisabz, and Karshi regions are considered the primary water sources. The river starts from the western part of the Hisor river system in Tajikistan, flows from the southern flank of the Obikhanda ridge, and begins from the western part of the Zarafshan river system. The upper part of the river is very steep, forming a deep canyon downwards. The Kashkadarya river is joined by the Yurgoq river, and the width of the river increases, reaching 120-150 meters. From this point on, the riverbed becomes wider, and the water flows towards the lower reaches.

From the Dugoba ridge (near the Farob settlement), where the Kashkadarya's left tributary begins, it is named Shingasoy. From the Shingasoy, the main water



sources branch off and spread widely through the lower regions. After passing through the Dugoba ridge, the river spreads out and flows through large irrigation canals (nearly 100 km long) and other relatively small artificial irrigation systems (10-50 km long). After passing the Dugoba ridge, the riverbed widens considerably. From the mouth of the Oqsuvdarya tributary, the width of the river varies from 200-250 meters and then expands to 800-1500 meters downstream. Due to this significant width, the river flows calmly and then reaches the Chiroqchi settlement. Before entering the Chiroqchi settlement, the river once again narrows significantly, and the water flows rapidly here. The Kashkadarya river is flanked by numerous small rivers and streams, which contribute to its water volume. Among them, the Jinnidarya river is one of the primary tributaries, and various other small rivers also flow into the river. After the contribution of these small river streams, the water sources of the Kashkadarya are considerably increased, and the river flows rapidly downstream. Moreover, another significant water source, the Oqsuvdarya river, joins the Kashkadarya from the east, nearly 20 km upstream from Chiroqchi. The water from this source is also fed from pasturelands and is joined by the Tanhozdarya.[3,89-95]

The Yakkabog river, which is a significant water source, originates from the junction of the Red river and Tirasoy water sources, below the riverbanks of the Kashkadarya and flows into the lower reaches of two major irrigation canals. One of these major irrigation canals is named Red river, which flows towards the northwest, and the second one is called Qorabog, which flows westwards. First, it flows into the Tanhozdarya and then joins the Kashkadarya. From this point onwards, the Kashkadarya's major irrigation canal is formed.

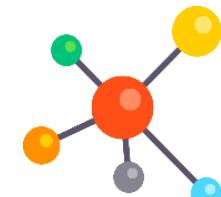
At the Chimqorgan settlement, the riverbed's width is around 150 meters. After the river passes the Oqsuvdarya's confluence, it widens again. From the location where this confluence takes place, the river flows calmly. Later, the river divides into several smaller irrigation canals.

From the confluence of the Korasuv, which belongs to the lower part of the Guzordarya, the Kashkadarya region begins. The river's existing water is distributed into several smaller irrigation canals before flowing into the Oasis River. In the lower part of the Vokha River, the Kashkadarya changes its name to Maimonokdarya. This older riverbed diverges before reaching the Karshi hills. [4,129]

The small Langardarya River starts from the Hisor mountain range and is located between the Yakkabogdarya and Guzordarya rivers. This river is characterized by its modest water volume, and after flowing through the foothills, it irrigates the agricultural fields of the farmers' settlements before reaching the Kashqadarya River.

Guzordarya River, which originates from the Hisor mountain range, is formed by the convergence of the Big Uradarya and small Uradarya rivers. In its lower course, it is referred to as Qorasuvdarya. During the spring and autumn seasons, its additional waters join the lower reaches of the Kashkadarya River. The upper streams of the Kashkadarya River consist of several rivers, including Jinnidarya, Oqsuvdarya, Tanhozdarya, Yakkabogdarya, Guzordarya, and Langardarya. They enter the Kashkadarya River with their clear, fast-flowing waters and form a network of smaller and larger tributaries.

As these rivers flow away from the mountains and pass through narrow stretches, they divide into multiple artificial irrigation channels (up to 10 km in length) and reach agricultural areas. Kashkadarya River, with its



steep left bank, lacks significant high rivers and tributaries. Instead, it receives small streams and watercourses that come close to the 20 Rivers. The Qoratepa mountain range, which does not have significant heights, contributes small to moderate amounts of water to the river. The available springs, due to the relatively low elevation of the Kashkadarya River, provide limited water flow. Four major basins formed by the convergence of these springs are Kalqamasoy (covering an area of 350 sq. km), Sho'robsay (49.4 sq. km), Makridsay (47.5 sq. km), and Oyoqchisoy (125 sq. km). These springs have a relatively low water flow due to the small size and lower altitude of their water catchment areas. Because of this, the water flow in these springs is quite weak, and despite their relatively short duration, these spring waters do not always reach the Kashkadarya River, or if they do, they add only a small amount of water to it.[5,81]

During the spring season, the water flow of the rivers increases, and the streams from the mountains contribute water to the Kashkadarya River. In times of lower rainfall, the spring waters do not reach the Kashkadarya River, and their flow is insufficient. The average altitude of the existing rivers' water catchment areas is also known.

In Kashkadarya, the maximum average monthly water flow occurs in July. In July, the average water flow is about 83.26 m³/s. The minimum water flow, on the other hand, occurs in January. In January, the minimum water flow is about 14.30 m³/s. The main source of water in the Kashkadarya River is the Oqsuvdarya River, with an average annual water flow of 13.8 m³/s, followed by the Yakka-Bo'gdarya River with an average annual water flow of 8.08 m³/s, and the Tanhozdarya River with an average annual water flow of 4 m³/s.[6,458]

The average annual water flow from the Kashkadarya River (near Varganza village) amounts to 5.46 m³/s, while the water flow of the Jinnidarya River (near Palandara village) is about 1.50 m³/s. From the point where the rivers emerge from the not-so-high mountain ranges to the Karshi region, the streams from the rivers, including the Oqsuvdarya, Yakka-Bo'gdarya, and Tanhozdarya, join the Kashkadarya River, contributing their waters, which also include spring waters. These major rivers account for approximately 80% of the annual water volume of the Kashkadarya River, making their average flow an essential factor in the river's water regime, and hence the average flow of the Kashkadarya River is consistently calculated.

The portion of the Kashkadarya region responsible for irrigation and water supply to cultivated fields is largely dependent on the water regime of the river. Hence, the remaining water sources need to be carefully considered to supplement the irrigation water supply.

Oqsuvdarya is a significant artificial water channel and is considered the main source of water for the Kashkadarya River. It originates from the Hisor mountain range and the confluence of Oqsuv and Ghilondarya. It provides a constant flow of water. This river contributes to irrigating several thousand hectares of farmland within the Kashkadarya region throughout the year. The average annual water flow of Oqsuvdarya is about 12 m³/s, and during the irrigation period, the water source reaches up to 23 m³/s. The lowest water flow is observed in January when it supplies close to 1 m³ of water per second. From Oqsuvdarya, the water flows through the irrigation channels to the cultivated fields and is mainly used from March to May. The highest water flow occurs in June and July, reaching around 12-15 m³/s during this period.[7,82-83] Kashkadarya River (near Varganza village) splits into three major artificial irrigation



channels after leaving the main riverbed. The right irrigation channel of Oqsuvdarya primarily supplies water to the Kitob region, while the left irrigation channel provides water to the villages of Muminobod and Chorshanba. Additionally, the remaining water in the Kashkadarya River is used for irrigation in the Shahrisabz region. Each of these three main irrigation channels has a length of approximately 10-12 km and serves to irrigate the farmlands of Kitob, Muminobod, and Chorshanba.

Kizildarya River originates from the upper streams of Yakka-Bo'gdarya and starts at an elevation of 1800 meters from the Hisor mountain range. Currently, Kizildarya's waters flow through the center of the Eskikorgoncha village, and later the water is used to irrigate the surrounding farmlands. The excess water then joins the Yakka-Bogdarya River. The distance from Kizildarya to its confluence with Yakka-Bogdarya is about 14 km. The average annual water flow of Kizildarya is close to 3 m³/s.

Tanhozdarya River is a significant irrigation channel that serves to irrigate the outskirts of Shahrisabz city. The river divides into several small irrigation canals on the western side of the river district, eventually merging with Yakka-Bo'gdarya and flowing towards Kashkadarya. The average annual water flow of Tanhozdarya ranges from 4.5 to 4.8 m³/s, while during the irrigation period, the water flow reaches around 8 m³/s. The most prominent irrigation channel of Tanhozdarya is Changqirqoq, with a length of about 10 km and an average annual water flow of 6-6.5 m³/s. During the rainy season, the water volume from the river can reach around 10-12 m³ per second.[8,83]

Yakkabog River. Originating from the Hisor Mountains, the Yakkabog River is formed by the confluence of the Kizildarya and Tirasoy water sources, and it serves as the main water source for the Yakkabog region. Yakkabog River divides into three major irrigation

channels in the northern-western part of Yakkabog district. These irrigation channels are separate because their water sources supply different areas for irrigation, facilitated by new artificial irrigation channels.

First irrigation channel: This major irrigation channel has an average annual water flow of 3 m³/s and during the irrigation period, the water volume reaches 5-6 m³ per second. This channel ensures sufficient water supply to the southern part of Yakkabog district's farmlands.

Second irrigation channel: The average annual water flow of this channel is about 5 m³/s, and during irrigation, the water volume increases to 8-10 m³/s. It covers the central part of Yakkabog district's farmlands.

Third irrigation channel: This significant irrigation channel has a notably higher average annual water flow, reaching 10-11 m³/s, and during irrigation works, the water volume can reach 20-22 m³ per second. It provides ample water supply to the northern and north-eastern parts of Yakkabog district's farmlands.

Guzordarya River. Guzordarya is mainly fed by underground waters, artesian wells, and spring waters. The river starts from the Hisor Mountains and is formed by the confluence of Big river and small river, which originate from the Pachkamar district. Guzordarya is the primary water source for Guzor district, and it splits into three major irrigation channels (Kli, Korasuv, and Kair) in the western part of the district. Korasuv is the natural continuation of Guzordarya. The average annual water flow of the river is 5.7 m³/s. During spring, especially during the rainy season, the water flow can reach 65-75 m³/s, while during January-February, the flow decreases to its minimum at around 1.5 m³/s. Changes in Kashkadarya River's water flow significantly affect the irrigation works. The primary



part of Guzordarya's water flow is directed through Karshi irrigation canals.

Guzordarya supplies a significant amount of mineral-rich sediment that helps increase soil fertility in the irrigated lands of Kashkadarya and Zarafshan rivers. Besides the natural sedimentation, additional sediment also flows through connecting channels into Kashkadarya. The three main irrigation channels (Kli, Korasuv, and Kair) in Guzordarya are responsible for irrigating farmlands located nearby. The remaining water of Guzordarya flows into Karshi, which is close to Kashkadarya.

Old Anhor Canal.

The Old Anhor Canal in the Zarafshan region has been utilized for irrigation purposes and agricultural development since ancient times, as indicated by archaeological evidence. The Old Anhor Canal's continuation is considered to be the Dargom Canal, starting from the Zarafshan River. The Old Anhor Canal has historically supplied water to the eastern part of Nurabad district, and it is one of the main water sources for the Kashkadarya region.

CONCLUSION

In conclusion, the information presented sheds light on the significance of water resources and irrigation systems in the Kashkadarya and Zarafshan regions of Uzbekistan. The data showcases the various rivers and canals that play a pivotal role in providing water for irrigation to support agriculture and the livelihoods of the local population. The presence of multiple irrigation channels demonstrates the region's commitment to efficient water management, ensuring a steady supply of water to agricultural lands throughout the year. The annotation and conclusion highlight the critical need to maintain and manage these water resources sustainable, as they are

essential for the socio-economic development and food security of the region. Additionally, this information may serve as a valuable reference for policymakers and researchers interested in water resource management and agricultural development in Uzbekistan.

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