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## THE IRRIGATION INFRASTRUCTURE IN SAMARKAND PROVINCE

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**ABSTRACT:** At the outset of the 20th century, the Soviet government, driven by pertinent political and economic objectives, commenced the implementation of a policy aimed at the development of the irrigation system and the construction of reclamation facilities in Uzbekistan.

**KEYWORDS:** Zarafshan, irrigation, Samarkand, Mastchoh (Koksuv), Turkestan, and Hisar.

### INTRODUCTION

The Samarkand oasis is situated along the middle course of the Zarafshan River basin. Bounded by the Koytash, Nurota, and Kirtog mountains to the north and south, which form part of the Turkestan and Zarafshan mountain ranges, respectively. During the analyzed period, the Zarafshan River basin spanned between 38°58' and 40°20' north latitude and 63°15' and 70°25' east longitude. The total area of the Zarafshan basin was 42 thousand square kilometers [5]. The entire area comprises a linear expanse, 50-60 km wide, extending from east to southeast to west-northwest. The eastern boundary of the basin commences from the Koksuv mountain junction, formed by the convergence of three parallel mountain ranges in the west - Aloy, Turkestan, and Hisar. The western boundary, where the Zarafshan River basin terminates, is demarcated by the Sandukli sands, which impede the flow of the Zarafshan River into the Amu Darya.

The territory of the Zarafshan River basin is delineated into two principal sections based on its natural and historical attributes: the eastern mountainous region and the middle and western valley. The northern boundary of the mountainous sector of the basin is defined by the Turkestan Ridge, encompassing the basin of the Zarafshan River originating from the northern slopes of the Turkestan Ridge, along with the rivers of the Syrdarya Basin. The principal boundary, marked by the Hisar and Zarafshan Ridges, demarcates the Zarafshan River Basin from a portion of the right tributaries of the Amu Darya and the basins of the Kashkadarya Basin.

The main water source of the region is the Zarafshan River, which begins under the name of the Mastchoh River in the Zarafshan Glacier at the junction of the Turkistan, Zarafshan and Olay mountain ranges - Mastchoh (Koksuv). About 189 km below the starting point, Fondaryo joins from the left and takes the name of Zarafshon. About 4,200 tributaries, originating from glaciers and springs, flow into Zarafshon. The largest are Fondaryo, Koshtudaryo, Maghiyandaryo (Marjondaryo). In the upper reaches of the territory of Tajikistan, the river flows very fast in a narrow valley with high and steep slopes, mostly gorges and gorges, starting from the village of Rizmut, between the Turkestan and Zarafshan mountain ranges. Then Kshut and Maghiyandarya will join him. The river valley widens a little only at the confluence of large tributaries.

The Zarafshan River exits the territory of Tajikistan near the Rabothoja dam, enters the border of the Republic of Uzbekistan, and traverses through the regions of Samarkand, Navoi, and Bukhara. In close proximity to the city of Samarkand, adjacent to the Cho'ponota hill, the river bifurcates into two branches, namely the Okdarya and Karadarya. Approximately 70-75% of the Zarafshan's water volume flows through the Karadarya network. Throughout this stretch, numerous streams originating from the surrounding mountains contribute to the flow, yet due to water diversion for irrigation purposes, many of these streams desiccate before reaching the Zarafshan and its branches.

Over a distance of 100 kilometers, the river reunites and forms the island of Miyanqal, encompassing an area of approximately 90 thousand hectares. Subsequently, the Zarafshan river courses through the Bukhara oasis in its entirety. However, as a consequence of water extraction for irrigation, the flow of the Zarafshan gradually diminishes, culminating in the river dividing into two branches - the Toykir (left) and Saribozor (right) - after the last irrigation fan, located 3 kilometers above the city of Karakol.

Both branches essentially function as irrigation canals in their upper reaches, regulated by a dam situated upstream of the city of Karakol. The Toykir branch, near the Kattabayot village area, is obstructed by an earthen dam, with its entire water volume utilized for irrigation purposes. Below, water from the irrigation network replenishes the basin, revitalizing the water flow, which subsequently feeds into the saline lake Dengizkol. Similarly, the Saribozor network serves as a crucial water source for the Karakol oasis before flowing into the Chigakol lake.

The Zarafshan River spans a total length of 780 kilometers. At the exit of the river into the Samarkand oasis, the average annual water flow is recorded at 165 cubic meters per second [1.58]. The Zarafshan River's catchment area exhibits considerable elevation, with an average altitude exceeding 3100 meters above sea level, particularly in the segment above the Dupuli bridge. This elevation results in the presence of numerous permanent snows and glaciers within the basin. Accounting for glaciers with an area of 1 hectare or more, the Zarafshan basin encompasses a total of 424 glaciers, spanning an area of 557 square kilometers. The Zarafshan River is sustained by the contributions of glaciers, permanent snow, seasonal snow cover, and spring waters. Additionally, the mountainous portion of the Zarafshan basin accommodates approximately 80 lakes [4].

The Fondaryo River is recognized as one of the primary tributaries of the Zarafshan River, originating from the confluence of the Yagnob and Iskandar rivers. The initial length of the river is 3.26 kilometers, while its total length extends to 24.5 kilometers. Fondaryo receives water solely from the Pasrudarya, which originates from the Kaznaq glacier in the Zarafshan range [3.135].

Koshtut Darya, another major tributary of the Zarafshan River, is formed by the confluence of the Vorukh and Artuch rivers, which receive water from the northern slopes of the Hisar Ridge and the southern slopes of the Zarafshan Ridge. These two rivers get the name Koshtut Darya at the confluence of Zarafshan.

During the study period, the total area of the river basin is 843 m<sup>2</sup>, and the average flow speed is 9.17 km<sup>2</sup> per second [3.151].

The Maghiyandaryo, also known as Marjondarya, is created by the convergence of several mountain streams originating from the northern slopes of the Hisar ridge. Among these streams, the longest is Darai-kalon, and the most significant tributary of the Marjondarya is the Shinkdarya. Due to its advantageous geographical position, Miyanqal has been inhabited since ancient times and has been regarded as one of the most densely populated areas. During this historical epoch, the oasis was primarily supplied with water by 22 canals originating from the Akdarya. The principal canals include Dargam, irrigating approximately 50 thousand hectares; Tuya-Tortar, servicing 33 thousand hectares; Yangigazon, providing water for about 21 thousand hectares; Mirza, covering 19 thousand hectares; Tokuz, irrigating 14 thousand hectares; Yarim Tuk, sustaining 12 thousand hectares; Besh, serving 7 thousand hectares; and Aq, supplying 5 thousand hectares. Additionally, 13 other canals distributed water to lands ranging from 4 thousand to 500 hectares each. The cumulative irrigated area facilitated by these irrigation systems approximates 170,000 hectares.

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