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HISTORY OF THE FIRST IRRIGATION STRUCTURES IN ANCIENT KHOREZM

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Abstract
This scientific article analyzes the history of ancient irrigation structures in the historical and cultural centers of the Lower Amudarya. It reveals the irrigation system, its operating mechanisms, and patterns of use. Based on this analysis, scientifically substantiated and summarized conclusions are drawn.

Keywords: Khorezm, Amudarya, Davdon, Darelyk, Turtkul, Beruni, Akchadarya, Keltaminar, Tazabagyab, Amirabod, Sulton Uwais.

Introduction

In the 4th century BC – 4th century AD, a qualitatively new stage of development of fertile and humid territories with the use of irrigation structures, significantly different from the Iron Age, was observed on the right and left banks of the Amu Darya.

Based on the results of large-scale research on the right and left banks of the Amu Darya, members of the Khorezm Archaeological and Ethnographic Expedition have concluded that, as early as the 9th–8th centuries BC, the population used irrigation networks for agriculture.

In the scientific literature, the question of whether the ancient irrigation structures were built directly from the Amu Darya or from its tributaries, the Davdon and Darelik, remains controversial.

The ancient period (4th century BC – 4th century AD) is an important stage in the history of not only the Khorezm oasis, but also the entire territory of Uzbekistan, characterized by profound changes in socio-economic and ethnocultural relations.

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During this period, urbanization processes encompassed all spheres of life in Khorezmian society. One of the characteristic features of the economic development of ancient society was the continuation of processes that had begun in the Iron Age.

Another important feature was the emergence of new settlements under the influence of urbanization, which served as cultural and economic centers. The population living in these settlements effectively utilized their available economic resources, which contributed to the further development of society.

An analysis of the scientific works of the participants of the Khorezm expedition and research from the period of independence made it possible to conduct a theoretical and comparative study of the problem.

According to the expedition's materials, during the archaeological work, the irrigation structures of Keltaminar, Tazabagyab, and Tazamirobad, which led from the Amu Darya towards the Kyzylkum Desert, were discovered, and the location of settlements along their channels was mapped[1]. Geological data indicate that about 22 thousand years ago the Amu Darya was divided into right-bank and left-bank sections.

A.I. Terenozhkin established that before the arrival of the Amu Darya, the territory of the Khorezm Plain (approximately 4.5 million hectares) provided approximately 2 million hectares of land suitable for agriculture. In his monograph, S.P. Tolstov described the directions of the most ancient irrigation systems (Keltaminar, Tazabagyab, Amirabad) in the Turtkul and Beruni regions[2].

M.A. Itina discovered an irrigation structure 1.8 km long and 15 m wide near the Yakke-Parsan-2 site. B.V. Andrianov described irrigation systems from the Bronze, Iron, and Classical periods in the Bozorkala area. Academician Ya.G. Gulyamov mapped the routes of ancient irrigation systems on both banks of the Amu Darya.

An analysis of scientific publications shows that as early as the 9th–8th centuries BC, the population was extending irrigation canals from the Akchadarya River toward the Kyzylkum Desert, a fact confirmed by archaeological evidence. Beginning in the 4th century BC, irrigation structures extending directly from the

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Amu Darya River began to play a key role in the socioeconomic life of the population.

On the right bank (between Shurahan and Mount Sultan Uvays), the Keltaminar, Tazabagyab, and Amirabad systems operated.

On the left bank, the Charmaniyab system, originating from the Davdon tributary, had a ramified network of canals along which settlements were located.

Archaeological research confirms the existence of a developed network of canals branching off in different directions, which provided irrigation for vast territories and contributed to the development of agriculture.

A summary of historical data presented in scientific works of the 20th century and the period of independence made it possible to identify the main economic factors in the development of ancient society.

In particular, it is shown that the Keltaminar, Tazabagyab and Amirabad irrigation systems, which originated from the Amu Darya in the direction of the Kyzylkum, as well as the Charmaniyab system, which originated from the Davdon tributary in the Sarykamysh region, played an important role in the formation of the economic base of society.

Irrigation structures contributed to the accumulation of mineral deposits, which created fertile soils and supported the development of agriculture. This, in turn, had a positive impact on the population's lifestyle and economic activities[3].

Over the course of millennia, the Amu Darya shaped the Khorezm Plain, dividing it into right-bank and left-bank territories and creating conditions for the development of irrigated agriculture. Artificial irrigation systems were established beginning in the late 5th century BC, and in the 4th–3rd centuries BC, large main canals were built, enabling the development of agriculture.

Based on the conducted research, the following conclusions can be drawn.

The development of socio-economic relations in the Iron Age was closely linked to the subsequent flourishing of the classical era. The 4th and 3rd centuries BC saw the active development of irrigation structures derived from the Amu Darya, which was associated with the policy of centralized associations[4].

The Khorezm Plain, located between the Kyzylkum and Karakum deserts, was a territory of ethnic formation from 40,000 to 35,000 BC. During the Stone, Bronze, and Iron Ages, the population effectively utilized the natural resources of

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the Amu Darya, which facilitated the development of socioeconomic and ethnocultural processes.

Based on the brief scientific analysis presented above, several proposals and recommendations can be put forward:

- A more in-depth study of the historical roots of the irrigation systems created by the populations on both banks of the Amu Darya is needed. A comprehensive study of the history of the Amu Darya, based on written sources and archaeological data, is also needed, taking into account its civilizational significance.
- A comprehensive study of the socio-economic and cultural life of the population of the ancient period should be continued.
- A comparative analysis of ancient irrigation systems with modern technologies is of interest. A comparative analysis of the ancient channels and irrigation systems of the Amu Darya with modern conditions is of interest.

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