HISTORY OF DEVELOPMENT OF OIL SYSTEMS IN UZBEKISTAN

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ABSTRACT

This article is a brief history of the development of irrigation in Uzbekistan covering the period from the Neolithic tothe present day. We describe the types of irrigation facilities, typical for a certain historical period , and for the climaticconditions of different regions of the country.

Keywords: *water, irrigation canals, agriculture, river, open irrigation, Surkhandarya oasis, Sopollitepa, Kuchuktepa, eastern part of Fergana valley, Chust, Dalvarzintepa, Amudarya delta, Bazar Kala, Koriz well, Zang canal, reservoir, Chigir, Abdullokhanbandi dam.*

ANNOTATSIYA

Ushbu maqola neolit davridan to hozirga qadar bo‘lgan vaqt oralig‘idagi O‘zbekiston hududida irrigatsiya tizi-mini rivojlanish tarixiga oid manbalar, ma’lum bir tarixiy davrlardagi iqlim sharoitlariga xos irrigatsiyainshootlari to‘g‘risida ma’lumotlar keltirilgan.

Kalit so‘zlar: *suv, sug‘orish kanallari, dehqonchilik, daryo, ochiq sug‘orish, Surxon vohasi, Sopollitepa, Kuchuktepa, Farg‘ona vodiysining sharqiy qismi, Chust, Dalvarzintepa, Amudaryo deltasi, Bozor qal’a, Koriz qudug‘i, Zang kanali, suv ombori, Abdulloqxondi to‘g‘oni, Chigir.*

АННОТАЦИЯ

Данная статья является кратким экскурсом в историю развития ирригации на территории Узбекистана, охва-тывающим период от неолита до современности. Описаны виды ирригационных сооружений, характерных как дляопределенного исторического периода, так и для климатических условий различных регионов страны.

Ключевые слова: *вода, оросительные каналы, земледелие, река, открытое орошение, Сурхандарьинский оазис, Сополлитепа, Кучуктепа, восточная часть Ферганской долины, Чуст, Дальварзинтепа, дельта Амударьи, Базар-Кала, колодец Кориз, канал Занг, водохранилище, Чигир, плотина Абдуллоханбанди.*

INTRODUCTION

High temperatures and golden sunlight, one of the main sources of life's development, are invaluable resources, but agriculture requires a lot of water. "Where the water runs out, the land runs out"-says our wise people. For centuries, the Uzbek

people have been working hard to build irrigation canals in order to create gardens in barren deserts.

Like ancient Egypt, China and other Eastern countries, the high farming culture of Uzbekistan appeared and developed on the basis of artificial irrigation very long ago. When studying the culture of farming on ancient irrigated lands from historical monuments such as Sugdiyona, Bactria, Khorezm, Ferganava Shosh, it became clear that farming on irrigated lands in Uzbekistan is mainly in regions with two favorable conditions, in valleys located at the foothills and on the banks of large river basins flowing in the plains. appeared and developed. Three main stages have been identified in the history of irrigation development in Central Asia[1].

DISCUSSION AND RESULTS

The first phase is a period that occupies a significantly larger period of time (from the Neopolitan period to the Late Bronze and Early Iron Ages). This period covers the period of birth of knowledge of irrigation field and learning to use open irrigated farming, small rivers flowing out into the expanses and drying up, and the parts of riverbeds that flow from time to time and make up the places of the lowlands. Gradually, the farmers began to move to new usable land by releasing the excess water from the flooded fields to other, low-lying areas, in addition to the flooded lands[1].

In the 4th millennium BC, in the southern highlands, the transition from open irrigation methods to open irrigation systems through irrigation systems began. took over the coastal regions (pictures 1-5).

The results of archaeological excavations of settlements in the occupied mountainous areas of Uzbekistan showed that the Surkhandarya oasis (Sopollitepa, Kuchuktepa), the eastern part of the Fergana valley (Chust, Dalvarzintepa, etc.), as well as the Amudarya delta area (Ko'kcha1-3, Bozor1- 8, 8-10, etc.), in the regions of Zarafshan (Zamonbobo) in the 2nd centuries BC, the ground was created for the birth of irrigated agriculture, i.e., the transition from backward irrigation methods to regular irrigation networks began.

In the middle of the 1st millennium BC in Central Asia, it was characterized by the invention of water distribution devices and trunk systems in the main valleys, as well as the extensive exploitation of the land areas on the banks of the large rivers of Central Asia (Amu Darya, Syr Darya, Zarafshan) for agricultural needs. The second stage of irrigation development in Nadigan has begun. As a result of the archeological researches of the following years, it was found that in this period, a large state emerged in Central Asia, which was of great importance in the economic, political and social life of its peoples[2].

1-picture. Pool

In Central Asia, in the anciently irrigated lands between the Amudarya and Syrdarya rivers, there are well-preserved traces of irrigation devices from ancient times. A system of canals was built and operated in Khorezm, Zarafshan Valley, Bactria and other regions.

In the 4th-5th centuries BC, a system of main irrigation canals was built in Sughd in Samarkand, and their irrigation system made it possible to irrigate a large amount of land. This system of irrigation canals served as the basis for the development of new lands and the flourishing of mining.

Of the old central irrigation networks, the ones located near BozorKala (southern part of Khorezm) are more interesting. According to the indicators, a large irrigation canal (more than 40 meters wide) was not carried out from the side stream, but from the main bed of the Aqchadarya river. It stretches for 1 kilometer. Irrigation networks are located along the entire length of the canal from the place where it receives water, at right angles to it, mostly in one direction[3].

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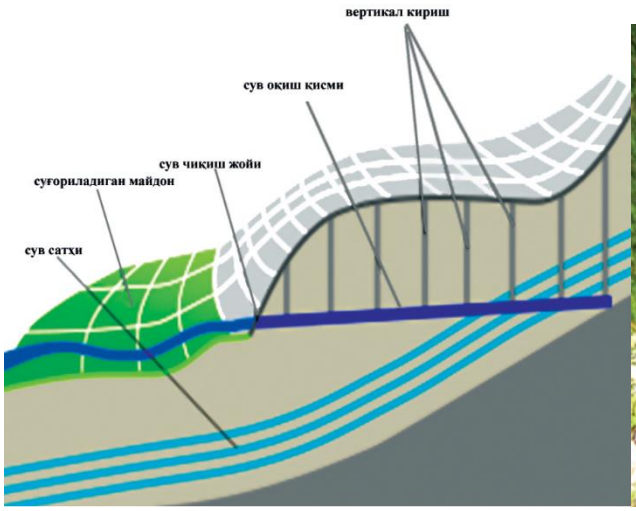
According to the calculations, 50-65 thousand m3 of soil had to be excavated for the construction of this canal, and 500 diggers would have to work for 35-40 days to complete such work (on average, 3 m3 of soil was excavated per day).

Another 15-kilometer long irrigation canal was built on the right bank of Khorezm, between the Adam-likkala and Yonboshkala fortresses. Here, the land area occupied by all irrigation networks is 2000 hectares[3].

According to separate accounts - books, the total amount of excavated soil is about 400,000 m3. No less than 500 earth diggers were required to perform earth digging work for 30 days. No fewer than 2,000 people are involved in dredging the canal every year[4].



2-picture. Coryza

3 - picture. Coriz well

Many works have been written in this regard (Ya. G'. G'ulomov "History of Khorezm's irrigation from ancient times to our time", Tashkent: UzSSR FA

Publishing House, 1957, B.V. Andrianov "Ancient irrigation systems of the Aral Bay region", Moscow: 1969, etc.)

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The remains of the ancient irrigation system in South Uzbekistan (Zang canal, etc.), ancient irrigated lands in Tashkent (Zakh canal) and the Samarkand oasis (Dargom canal) and mainly in the lowlands along the Amudarya, Syrdarya and Zarafshan rivers indicate that the period of high development of ancient irrigation networks dates back to the 1st-4th centuries BC. is correct.

4 - picture. The beginning of coryza

The large central canals that irrigate large areas in Central Asia today, such as Bozsuv and Salor in the Tashkent oasis, Eski Angor and Tuyatortar in the Samarkand oasis, Shokhrud and Romitonrud in the Bukhara region, Kyrgyz, Chorman-Yob and many other canals in Khorazm, were abandoned for a long time at the beginning of our century. after the period, rebuilt, or reconstructed.

Thanks to the successful development of irrigation facilities and irrigated agriculture in the basins of large Central Asian rivers in antiquity, very large areas of land were irrigated and many new lands were developed, and many ancient cities appeared in the Buer region, and open settlements were strengthened[4].

The third stage of irrigation development in Uzbekistan corresponds to the early and advanced period of the Middle Ages.

During this period, complex and multi-network irrigation systems were operating in Sughd in Samarkand. From Samarkand in the Middle Ages, three large irrigation canals, which irrigate the Karabers to the south, were laid out in the Varagsar region ("the head of the dam", in the modern era - Ravot and Khoja massifs).

5-picture. The outlet of the drain

According to the records related to the conquests of the Arab conquerors, V. V. Bertold pointed out that this system existed and functioned even before the Arab conquest, that is, in the VI-VII centuries BC.

At that time, a canal supplying water to the city of Samarkand was operating.

In the Middle Ages, one of the canals located below Zarafshan, in the territory of the Bukhara oasis, was called Shopir-kom (later - Shofirkom).

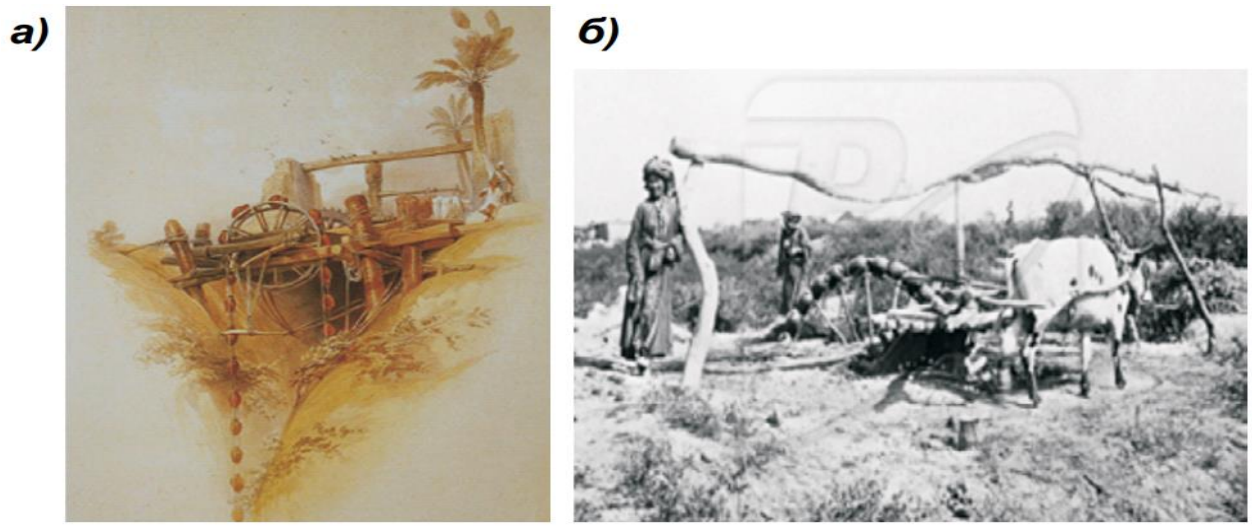
This canal irrigated the northernmost part of the Bukhara oasis - the lands of the Bukhara-khudatla (rulers of Bukhara) owned by Vardon. In addition, several other large channels were active.

Musa al-Khwarizmi (783-850), the great scholar of Central Asia, wrote in his works about the ancient farming culture that since the demand for irrigation systems was high in these lands, constant research was carried out on the introduction of new devices and methods[5].

In the 9th-10th centuries, great importance was attached to the development of agriculture. Even the "Law on Water Use" ("Law on Aqueducts") was adopted.

Shopurkon, Shokhrud, Kar-mana, Paykand canals were built in Bukhara oasis, Borsh, Buzmadison, Ishtikhon canals were dug in Samarkand oasis.

There were many canals in Khorezm, Shosh and Fergana valleys. According to the information of the Arab traveler Ibn Khaukal, there were many gardens and orchards with several villages in the vicinity of Bukhara[5].



6–picture. Chighir

At that time, there were 17 irrigation systems in Bukhara. The amount of water flow in the canals is controlled by responsible officials appointed by the state.

10,000 managers were working in the Murgob Valley alone, responsible for the distribution of sewage in the canals.

7-picture. The cistern

In the 10th-12th centuries, the mountain pre-drought areas of Central Asia, where there were no permanent water sources, were considered the largest at that time. The mountain reservoirs designed to catch and collect spring agricultural water are of great importance. One of them, 12-15 km north of the foothills of the Nurota mountains, a water reservoir was found in the Khanbandi valley, built in the 10th century, surrounded by the Pastog mountain ranges.

The dam, which blocks the narrowest part of a small valley surrounded by mountain ranges, is made of local granite stones with a mixture of lime and quartz sand. The length of its upper part is 51.75 m, the lower part is 24.45 m, the height is 15.25 m, the upper part is 2.30 m, the base is 8.20 m.

The dam is provided with nine outlets for different heights of water depth in the basin. These water-releasing holes have an arched shape from the top, and their average width is 45-70 cm and height is 50-100 cm. In front of the dam, there was a water reservoir with a length of 1.5 km, the width of the dam was 52 m and at the beginning of the water reservoir was 200 m, the capacity was 1.5 million m^3.

This made it possible to irrigate the Kaltepa desert, whose land area is 1500 hectares, bordered by Kyzylkum surroundings. Here a strong built-in bed was built. Its ruins, called Kaltepa, are located 4 km northwest of the Khanabad dam[2].

Khanbandi Dam was a very strong structure. Its slope is 0.25 (1:4). This was not done by accident. The level of rising water pressure was 28 t.n at 1pog.m. When the length of the dam was 51.75 m, the water pressure reached 1447 t.n. It should be noted that the construction of the Khanbandi dam does not differ from the high-pressure dam walls made of modern construction materials.

The same water structure, built in the Middle Ages, is located near the village of Okchop, 65 km east of the Nurota district of the Samarkand region. This dam, known as Abdullokhanbandi, was built by digging shale slabs with a mixture of lime and ash. The length of the top part is 85 m, the base of the base is 73 m, the width of the base is 15.3 m, the upper part is 4.5 m, the preserved higher part is 9.5-4.5 meters. The control of the water distribution gate had a structure consisting of sliding parts placed on top of each other, which was widely used in irrigation devices in the Middle Ages in the East. In the middle part of the dam wall, there is a two-layer water outlet. The first floor is in the form of a transverse pipe 1 m high from the base of the dam, 19 m long, 50-60 cm wide, 1 m wide, 50-60 cm wide, and 1 m deep. It is connected with a transversely located well. At the exit points of the water holes from the dam, there are control devices of 20x20x100 cm located transversely upwards along both walls, and they are made of beams that serve to block the water.

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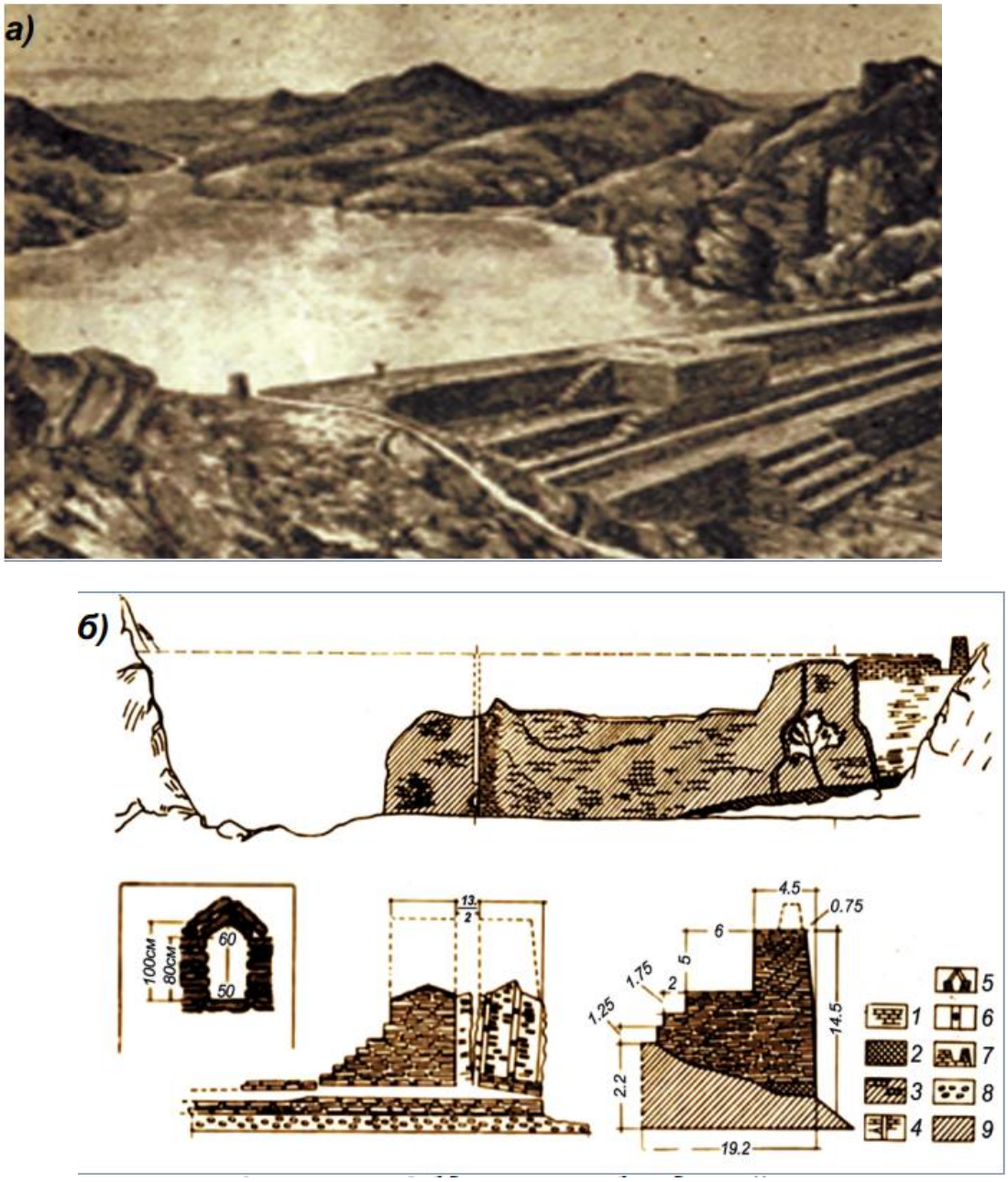
All the information shows that the Abdullokhanbandi Reservoir was a real engineering facility with shaft-shaped water outlets, rotating, and emergency emergency release devices.



8–picture. Abdullah Khanbandi dam

Thus, the development of sciences, first of all mathematics and geometry, on the one hand, the development of knowledge about architecture and construction methods, and on the other hand, the development of knowledge about irrigation devices - in the middle ages, in the form of engineering, made it possible to build

perfect water structures by picking from local materials such as stone and brick with waterproof mixtures.

But the development of irrigation was stopped several times during this period due to feudal wars. Genghis Khan's campaign was particularly disastrous, turning many flourishing oases of Central Asia into barren deserts.

CONCLUSION

The historical development of Uzbekistan was inextricably linked with irrigated farming. Our ancestors, based on the experience accumulated over thousands of years, created advanced irrigation networks, the construction of which requires not only the involvement of human capabilities and management methods, but also a large amount of scientific knowledge - understanding of geology, geodesy, and special engineering knowledge. Only the unification of all existing conditions ensured the development of water use and irrigation in accordance with ancient traditions in Uzbekistan.

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