



## **DEVELOPMENT OF IRRIGATION SYSTEMS IN THE MIDDLE AGES**

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<b>Received:</b> 17 <sup>th</sup> October 2023 <b>Accepted:</b> 14 <sup>th</sup> November 2023 <b>Published:</b> 20 <sup>th</sup> December 2023	Central Asia was the one of the cultural developing continent from the history. As the results of the invasions, the existing irrigation systems in the country broke down, which led to the depression of artificial irrigation farming. This article discusses the influence of the history the irrigation system on the socio-economic development of the country in the Middle Ages
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The emergence of independent states in Central Asia in the 9th-10th centuries was of great importance in the development and improvement of the irrigation system and the culture of irrigated agriculture. The culture of irrigated agriculture based on artificial irrigation began to develop rapidly in the early 9th-13th centuries. In this period, in Central Asia, during the Samonites (819-1005), Karakhanids (998-1212) and Khorezmshaks (1077-1221) states, not only the irrigation and irrigation technology, but also the irrigated land areas in the lower reaches of the Amudarya and Syrdarya increased to 2.7 million hectares of newly acquired land. reached, including intensively irrigated land area was 1.7 million ha. These figures corresponded to 2/3 of the irrigated areas in the period when ancient irrigation was developed.

A number of reforms were carried out during the Samonite dynasty (819-1005). Zarafshan Valley, one of the main regions of Movaraunnarkh, has a well-developed culture of all types of agriculture, including irrigated agriculture. As a result, in the 9th century Movaraunnahr became a country with developed agriculture.

According to the information given by the IX-X century literature on geography about the agricultural crops grown in Movaraunnahr, in Zarafshan, Kashkadarya valleys, Fergana, Ilaq, Shosh and Khorezm, farmers planted wheat, barley, rice, millet, and cotton wherever agriculture was carried out on the basis of artificial irrigation.

Even in the Middle Ages, the head of the main canals, where water is taken from the river, was of strategic importance, and this requirement is still maintained today. In the Middle Ages, foreign conquerors, rulers and local nobles wanted to achieve their goals by occupying or destroying the head of the canals and leaving the population without water. We can cite

many examples of this from history. When the Sogdians revolted in 721, the viceroy of Khurasan, Said Husayn, tried to close the head of the Dargom canal in Vargsar in order to leave the population of Samarkand and its surroundings without water. But the Sogds protected Vargsar with a strong guard. Also, in 735, when Movaraunnahr rebelled against the Arab caliph, Asad ibn Abdullah, the viceroy of Khurasan, tried to leave Samarkand city and its surrounding population without water. But this time the viceroy of Khurasan did not achieve his goal. In the early Middle Ages, when the dam of the Dargom canal was built in Vargsar, a strong fortress was also built, and the head of the canal was guarded by strong soldiers. According to Nasafi's information, there was a strong army in Vargsar - 400 horsemen and 1200 fighting soldiers. In the 15th century (Vargsar), the military chief of Shavdar district lived in the fortress of Ravothoja.

A characteristic feature of the large land ownership in Central Asia and Iran is that the landowners did not carry out large-scale economic activities on their land and did not cultivate their land with the labor of serf farmers. Large landowners usually divided their land into small plots, which were given to all those who needed them on a cooperative basis. In this way, they took land and planted crops on the basis of a tenant farm, which served as a source of livelihood for them.

The Samonite state paid special attention to the development of agriculture and the improvement of the irrigation system associated with it. As a result, the irrigation channels were somewhat expanded, as a result of numerous digging of water structures (canals, ditches), agriculture and horticulture developed rapidly.

According to Ibn Havkal, an Arab traveler and geographer, the Sogd (Zarafshan) river flowed through prosperous villages to Bukhara. 17 irrigation canals were built in Bukhara and served the development of



irrigation farming culture. Repair and expansion of a large number of irrigation facilities, as well as the necessary volume of water flow from them, were the responsibility of the relevant state officials. Only in the Murgob Valley, 10,000 officials were engaged in water construction and supply.

Mathematician and astronomer Muhamad ibn Musa Khorezmi, encyclopedist, scholar Abu Raikhan Beruni, Ahmad Farghani and many other leading scientists of their time played an extremely important role in the development of medieval irrigation. In the 9th-11th centuries, the development of mathematics, geometry, physics, astronomy and other natural sciences gave a great impetus to the development of the irrigation system. For example, Abu Rayhan al-Beruni in his book "Memories of the Past Ancestors" gave information about the location of water sources, the equipment for determining the direction of canals, measuring the land surface, and measuring the slope of the land.

In the development of artificial irrigation, in the X-XII centuries, many water reservoirs built in mountain gorges, in regions where there are no large rivers, gained decisive importance. Most of these reservoirs are built to store the spring flood flow. One of them is the Khanbandi reservoir in the Nurota mountain gorge near the city of Forish (12-15 km). The upper length of this dam is 24.45 m, the height is 15.25 m, the thickness of the upper side is 2.30 m, and the length of the lower side is 8.20 m. The dam has eight sluice holes to account for the rise and fall of water. The average width of the holes is 45-70 cm, the height is 50-100 cm.

In front of the dam, the reservoir is 1.5 km long, 52 m wide, 200 m at the beginning of the river, and has a total capacity of 1.5 million m<sup>3</sup>. Kaltepin Desert is an area 4 km from Khanbandi Dam.

Academician, archaeologist Ya.G'. Ghulomov, based on archeological data, said that the Kaltepin desert dates back to the 10th century.

By this time, the Kirq-Kiz canal, which was built in the oldest period on the (right bank) of Khorezm, was rebuilt. Main canals built in the Middle Ages were dug 100-150 km long. Khorezm (left bank) Chermonyab canal is 150 km long, and its average width is 12 m. The excavation volume of this 100 km long canal is 1 million m<sup>3</sup>. The total irrigated area in Chermonyab canal basin is 35-40 thousand.

One of the achievements of the medieval irrigation technique was the discovery of a water-lifting structure, i.e., the chighir, and its wide use in Khorezm in the 9th-11th centuries, which became important in the development of irrigated agriculture. Especially

when the water consumption in the irrigation canals decreased, the pipe structure played a big role in raising the water from the deep canal.

In the 9th-10th centuries, farmers planted wheat, barley, rice, millet, cotton and other cultivated crops in all places where agriculture was carried out on the basis of artificial irrigation in Movoraunnahr. Horticulture was at a high level in the 10th century. Agriculture based on irrigation developed rapidly in Mavorunnahr and Khorezm in its time. While describing the Zarafshan Valley, Istakhriy, a traveler and geographer from Arabia, enjoys its fruitfulness. He was amazed that the foot of the river valley of the Bukhara region became like a blue-blue carpet with plants. In the 9th-12th centuries, as in a number of regions in Central Asia, the attention to irrigated agriculture increased in the Ferghana Valley. As a result of the construction of highly complex irrigation facilities and the expansion of canal networks, the productivity of irrigated lands has increased. In this way, this valley has become an economically developed region. Industriousness of the population, availability of land and reserves also became important factors. (R.S.) The culture of irrigated farming has been developed in the Fergana valley since ancient times. Researcher Isokov writes that the Fergana Valley was one of the lands of Central Asia where farming culture developed from ancient times. The information about valley farming in the 10th-11th centuries was also found in Arab sources, especially Arab travelers and geographers such as Istakhri, Abu Haim ibn Havhal, Abu Sa'd al-Saman, Yaqut al-Hamawi wrote down.

In fact, as a result of the development of agriculture based on artificial irrigation, the country was abundantly fertile. In the 10th-12th centuries, mutual wars between the states of Central Asia, invasion policies of the Ghaznavids, Karakhanids and Karakhitas led to the destruction of the infrastructure of their time in the existing socio-political, economic and cultural spheres in Central Asia.

Thus, the wars between the states in the 11th-14th centuries, especially depression caused by the Mongol invasion, caused the existing irrigation system in our country to be completely disabled, destroyed, and canals and ditches were destroyed. In such conditions, our ancestors, looking to the future with hope, used the great wealth and water of our motherland as much as possible, cultivated crops and ensured the continuation and development of generations as much as possible.



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