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From The History of Traditional Methods of Water Use and Its Management System Among Uzbeks In The Late 19th – Second Half of The 20th Century

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Abstract: The article, based on available sources and historical literature, describes the history of traditional methods of water use and water resource management systems among the Uzbeks in the late XIX – second half of the XX centuries. Special attention is given to the functioning of traditional irrigation networks, the role of community leaders in regulating water use, and the adaptation of these practices to changing political, economic, and environmental conditions. The study highlights the continuity of indigenous knowledge and its influence on modern approaches to water management in Uzbekistan.

Keywords: Water, Mirob, Sepma, Dempa, New, Obondoz, Obron, Arbob, Poikor, Juibon, Warkbon, Bandibon

Introduction

The ancient high culture of the Uzbek people was, in many respects, closely connected with their activities and remarkable achievements in irrigated agriculture and irrigation practices. Ancient hydraulic structures represent outstanding examples of irrigation techniques created by our ancestors, further embellishing the pages of our centuries-old history.

In the history of the development of irrigation technology among our people, the problem of lifting water to higher ground in cases where the surface level of running water was lower than the agricultural fields has always held critical importance. In the process of solving this vital issue, undoubtedly through practical experimentation, various hydraulic water-lifting devices were invented. For instance, in Khorezm, the methods known as *"sepma"*, *"depma"*, and *"nova"*—which continued to be used until relatively recent times for irrigating elevated lands—are considered the simplest types of such ancient water-lifting mechanisms

Methodology

Through these methods, water was raised from small reservoirs dug along the canals using paddle wheels and troughs, and directed slightly higher in order to irrigate only small agricultural plots. However, in such irrigation practices one person was constantly engaged, and the efficiency of irrigation remained extremely low. According to calculations made by elderly mirabs (traditional water supervisors) of Khorezm, using the *sepma* method it was possible, on average, to irrigate only one-quarter of a *tanab*—that is, approximately 0.05 hectares—over the course of an entire day.

By the late 19th and early 20th centuries, the lands situated along the banks of the Amu Darya were irrigated by nearly 70,000 water-lifting wheels (*chaqir*). According to S. K. Kondrashev, each water wheel completed approximately 268 revolutions per hour, lifting around 20,000 liters of water during that time. During the irrigation season, each wheel could, on average, provide sufficient water to irrigate up to three *desyatinas* of land.

In our view, the construction of large-scale irrigation networks and the introduction of water onto vast tracts of land in river valleys—especially in the *adok* regions—inevitably led to a deterioration of the meliorative condition of agricultural fields. The need to maintain proper reclamation standards for cultivated lands, without doubt, stimulated the transition in irrigation technology toward the use of water-lifting devices such as water wheels.

Y. G'ulomov connects the emergence of water wheels (*chig'ir* and *charxpalak*) in Khorezm with the broader technological transition in the economy—from milling stones (*yormatosh*, *yorg'uchoq*) to hand-mills, and subsequently to rotary motion mechanisms such as water-powered mills. He suggests that irrigation using water wheels in Khorezm originated in the 5th–6th centuries CE, and that these devices were modeled after the water wheels (*saqiya*) of ancient Egypt—the homeland of classical irrigation.

Indeed, the Khorezm water wheels were structurally very similar to the Egyptian *saqiya* as well as to the *charx* devices of India and Iran. In the medieval period, every agricultural oasis had a specialized administrative body for water management under the authority of the chief *mirob*. This institution, functioning as a kind of "community works office," included the heads of the major hydraulic units (*panjabegi*), dam constructors (*varkbon* or *bondibon*), canal overseers (*juybon*), those responsible for diverting water from the upper to the lower reaches of the river (*obandoz*, *obron*, *manquvat*), and the *arbob* and *poykor*—the overseers of village canals—among others.

According to historical records, during the medieval period in the Bukhara districts, irrigation works were overseen by the provincial *qozis* (judges). As Narshakhi writes, in 828, when the jurist Said ibn Khalaf al-Balkhi was appointed as the *qozi* of Bukhara, he established fair laws and regulations. In particular, to prevent the powerful from oppressing the weak, he ordered the construction of dams on the Shahrud canal and recommended that the waters of Bukhara be distributed with justice and fairness. In the Samarkand oasis, the *mirobs* of the main canals were known as *"ariq oqsoqol"* (canal elders).

By the late 19th and early 20th centuries, in this oasis alone, water management was administered by 28 *ariq oqsoqols*, 66 *bandibons* (dam builders), and 410 branch canal *mirobs* (*juybons*). This compact and effective local administration, composed of representatives of both the government and peasant communities, played a leading role in maintaining the main dams of large irrigation networks, constructing embankments along riverbanks eroded by floods, cleaning silt from irrigation canals, distributing water on a rotational basis, and draining surplus or saline water into wastelands through drainage systems.

For their services, chief *mirobs* received salaries from the state treasury, known as *"maoshdaxyak."* The *mirobs* of branch canals, however, collected their fees directly from the peasants. This fee, called *"mirobona,"* was paid annually in kind from the harvest. Typically, each peasant household contributed one or two sieves (*galvir*) of grain—equivalent to about 8–16 kilograms—at the time of threshing.

Result and Discussion

Interestingly, collective works (*hashar*) organized under the leadership of the *mirobs* were conducted strictly according to the agricultural calendar and with fixed order. Under conditions of feudal landownership, in addition to the heavy physical burden of irrigation work, ordinary peasants using water were obliged to pay numerous levies and fines related to water management and *hashar*. These included the *qo'sh puli*, *labaki puli*, *mirobona*, *boqiy puli*, and *qon puli*. The *qo'sh puli* consisted of two tangas per pair of land units, while the *labaki puli* amounted to four tangas. Those who failed to participate in *hashar* for cleaning canals or repairing water structures were fined the *boqiy puli*—two tangas for each day of absence.

During the reconstruction of the main dams of the magistral canals, a levy called *"qon puli"* ("blood money") was collected from the participants of *hashar* (communal labor) to cover the costs of animal sacrifices and ritual bloodletting. In addition to this, peasants in Bukhara and Khiva were compelled to pay various dues in kind for the services of *arbobs*, *poykors*, and *juybons*, such as the *"juycha puli"* (canal fee), *"chig'ir puli"* (waterwheel fee), and *"arbobona"* (fee for the village head).

Thus, in the agricultural oases, there existed a highly complex water management system, the history of which is inseparably linked with the centuries-long strenuous struggle of the rural population to secure water.

In districts located far from rivers, in foothill areas and semi-desert zones, ingenious irrigators made significant contributions to the development of irrigation technology by constructing *sardobas* (domed cisterns) to collect winter snowmelt and spring rainwater, *hovuz* reservoirs with sluices for spring water, dams (*band*) built on engineering principles to retain floodwaters, and *karez* underground channels to utilize subterranean waters.

In building irrigation facilities, ancient irrigators attempted to solve complex technical problems with remarkable ingenuity, taking into account the dynamics and pressure of water flow and applying precise engineering calculations. Even in the medieval period—long before the invention of cement—master builders of irrigation works had

already discovered special hydraulic construction mixtures resistant to water and moisture. These were widely employed in the construction of water structures, building foundations, and the laying of sewage pipes.

Undoubtedly, the study of this rich body of popular experience provides invaluable insights into the history of irrigation in Uzbekistan and the evolution of irrigation technology. At the same time, in the present era—when large-scale improvements in irrigation and land reclamation are being undertaken—this knowledge holds significant importance for the national economy. For example, the spring floodwaters of large and small streams flowing from mountain gorges can be collected in small reservoirs to irrigate thousands of hectares of farmland, particularly household plots, orchards, and pastures. Moreover, the construction mixtures discovered by ancient master builders and the techniques for producing high-quality fired bricks can be utilized in architecture, especially in the production of local building materials used in the restoration of historical monuments. With such durable bricks and hydraulic mixtures, not only can the original appearance of every fifty restored monuments be faithfully reconstructed, but their lifespan can also be considerably prolonged.

By the late 19th century and into the second half of the 20th century and beyond, the hierarchy of crops cultivated in agriculture was as follows: in first place, cereal crops; in second place, horticulture and viticulture; in third place, vegetables and melons; in fourth place, alfalfa and other fodder crops for livestock; and in fifth place, cotton. Even in that period, land tenure—whether as collective or private property—was the main factor determining crop selection, planting, and consequently, the resolution of all issues related to water use. Initially, all reclaimed lands, including irrigated plots, were considered communal property, held by tribes or clans. Over time, however, within the framework of these communal holdings, new forms of land ownership emerged, leading to the establishment of land as private property.

Conclusion

Such hydraulic structures were constructed on the basis of the people's centuries-long accumulation of intellectual knowledge in irrigation. Most of these works were uniquely adapted to the natural conditions of valleys, foothills, mountainous regions, and steppe lands of the country. Particularly in their design and construction, careful consideration was given to local relief, coefficients of water resources, and seasonal fluctuations. Measures were taken to ensure their stability against the dynamic and hydraulic forces of water flow. As a result, these ancient waterworks, built upon centuries of practical experience, served productively for long periods both in irrigated agriculture and in the supply of drinking water to the population.

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