

THE PLACE OF THE AMU-BUKHARA CANAL IN THE BUKHARA IRRIGATION SYSTEM

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Abstract: *This article highlights the transformative role of the Amu-Bukhara Canal in the development of the Bukhara irrigation system and the role and significance of the Amu-Bukhara Canal in the Bukhara irrigation system.*

Keywords: *draft project of the Amu-Bukhara Canal, increasing cotton and grain production, irrigation construction, construction by hashar method, hydrographic study, Amu-Bukhara machine canal, use of mechanical pumps and engineering equipment, equipment and material and technical support.*

The Amu-Bukhara Canal played a transformative role in the development of the Bukhara irrigation system, serving as its main and main water source. Built to divert water from the Amu Darya, the canal was intended to provide a stable and controlled supply of water to the arid regions of Bukhara and Karakul, where agriculture had previously been limited to inadequate and unreliable irrigation. The canal allowed for the expansion of irrigated land, increased production of cotton, grain, and other staple crops, which in turn ensured local food security, and supported the region's integration into the broader Soviet economy.

The Amu-Bukhara Canal project was a strategic initiative to divert water from the Amu Darya to the Bukhara region, thereby improving the irrigation system, supporting agriculture, and improving the livelihoods of the local population. "According to a special letter sent by the military governor of the Zarafshan district to the Governor-General of Turkestan on January 25, 1886, the written information of Z. Zhizhensky and the attached draft project of the Amu-Bukhara Canal will be discussed on January 30 of this year at the construction committee under the diplomatic office of the Turkestan governorate"¹⁷. At that time, water management was a key issue in the Russian Empire's administration of Central Asia. Control over water resources not only had economic consequences, but also strengthened political power over semi-autonomous regions such as the Emirate of Bukhara. Z. Zhizhensky's contribution was decisive. His written memorandum and the accompanying schematic diagram of the canal provided a technical understanding of the feasibility of implementing the project. The documents included

¹⁷ ЦГА УзССР, ф. И-1, оп. 14, д. 668, л. 1-3





proposed routes, engineering problems, expected costs, labor requirements, and potential benefits. This comprehensive approach reflected the growing attention of the Imperial Russian government to modernizing the infrastructure of the territories under its control. The Construction Committee under the Diplomatic Office played a key role in assessing such development initiatives. At its meeting on January 30, it was expected to decide whether to proceed with the planning or implementation stages of the Amu-Bukhara Canal. Given the scale of the project, this was not simply an administrative matter, but a decision with significant regional implications. The proposed canal was seen as an opportunity to transform the socio-economic landscape of the Bukhara region. Improved irrigation would bring previously uncultivated lands into use, increasing agricultural productivity. It would also allow for greater integration between the Bukhara Emirate and the Russian imperial system, aligning local economic activity with broader imperial goals. In addition, such infrastructure development projects were seen as tools of political consolidation. The Russian Empire could exert influence over Bukhara by controlling the flow of water, a vital resource for the arid climate of Central Asia, and ensuring the loyalty and obedience of local rulers. Thus, the Amu-Bukhara Canal was a symbol of progress and power.

The Amu-Bukhara Canal was envisioned as a major hydraulic engineering structure that would divert water from the Amu Darya to the lands of the Bukhara Emirate. The initiative was intended to improve irrigation, increase agricultural productivity, and facilitate the region's broader economic integration into the Russian imperial system. It also reflected broader imperial ambitions to modernize and establish tighter control over the Central Asian territories. "To dig a canal of the size recommended by Z. Zhizhensky, it would have required 20,440,000 workers, not 350,000 laborers, as the project indicated"¹⁸. The Zhizhensky report provided a detailed analysis of the proposed route, projected costs, topographical difficulties, and labor required to construct such a large canal. However, one major issue emerged in evaluating the report: a serious underestimation of labor requirements. Zhizhensky's original proposal suggested that the project would require approximately 350,000 workers. However, upon further investigation, it was estimated that the project would actually require an astronomical 20,440,000 workers to dig a canal of the proposed size, revealing significant logistical shortcomings in the project. This discrepancy demonstrated a lack of realistic planning and highlighted the enormous scale of the undertaking. The large discrepancy between the proposed and actual labor requirements indicated either miscalculations or, perhaps, a deliberate attempt to minimize the actual scale of the effort in order to secure initial

¹⁸ ЦГА УэССР, ф. И-1, оп. 24, д. 243, л. 21-22



approval. However, he noted that large-scale infrastructure projects were difficult to implement in remote and underdeveloped regions at that time, where mechanization and resources were limited. The proposed canal was not just a technical or agricultural project, but also had great political and strategic importance. The Russian Empire saw control over the water resources of arid Central Asia as a tool for domination. By controlling irrigation systems, they could influence the local economy and strengthen political control over states such as the Emirate of Bukhara. Furthermore, if successful, the canal could transform the agrarian economy of the region by allowing previously barren lands to be irrigated year-round, thereby increasing the production of cotton and grain, which were so valuable to the economy of Imperial Russia. It also had the potential to facilitate population resettlement, new agricultural colonies, and greater integration between Bukhara and the Russian administrative structure. It was argued that either the project would have to be significantly scaled back, or additional technological and organizational innovations would be needed to implement it. The sheer number of workers—20 million—was well beyond the region’s capabilities, making the original plan unfeasible.

The Amu-Bukhara Canal project encapsulates the conflict between imperial ambitions and logistical realities. While it reflected the Russian Empire’s desire to reshape and modernize its Central Asian territories, the impracticality of the initial plan demonstrated the limitations of engineering and administrative capabilities at the end of the 19th century. The correspondence and the planned committee meeting of 1886 provide not only a moment of bold vision but also a vivid example of the difficulties encountered in implementing grand imperial projects.

The construction of the Amu-Bukhara Canal was envisioned as a project of immense strategic and economic importance to the Khanate of Bukhara. The canal was intended to bring irrigation water from the Amu Darya to the arid lands around Bukhara, which would significantly increase agricultural productivity, expand settlements, and improve food security in the region. Given its scale, the canal was considered a state-level initiative that required careful planning, advanced engineering knowledge, and long-term investment. “They believed that this irrigation construction, which was of state importance to the Khanate, was absolutely impossible to implement by hashar, and therefore the Turkestan administration should not support it”¹⁹. But many observers and administrators at the time, including Russian officials in Turkestan, expressed serious doubts that such a complex hydraulic structure could be completed using the traditional hashar method. Hashar was a centuries-old practice in Central Asia, where communities

¹⁹ ЦГА УэССР, ф. И-1, оп. 24, д. 243, л. 22

were formed to carry out public works such as repairing roads, repairing irrigation ditches, or repairing mosques. While useful for small-scale projects, hashar was based on voluntary or semi-compulsory participation, and lacked professional supervision, technical planning, and stable financing. Critics of the canal project argued that the size of the Amu-Bukhara Canal, the technical challenges of channeling water across deserts, building embankments, and managing flow distribution, and the long construction times made it unsuitable for hashar-based labor. They believed that such a method would lead to inefficient labor, poor quality results, and ultimately the failure of the project. Moreover, without proper wage incentives and organizational management of the workforce, the required number of workers could not be mobilized consistently.

Consequently, these skeptics advised the Turkestan administration not to support the canal initiative unless it was supported by the central government, provided sufficient financial resources, and implemented with professional engineering assistance. Their position reflected broader changes in Central Asian infrastructure policy in the late 19th and early 20th centuries, when traditional practices were seen as failing to meet the demands of modern state-building and economic development. “Given the slope of the Amu Darya and the elevation of the region in which Bukhara is located, if the canal were constructed at a gradient of 0.0002, the Amu-Bukhara Canal would then have to start 215 miles upstream of the city of Chorjoi”²⁰. The city of Charjoi (now known as Turkmenabad). This calculation highlights a significant engineering problem in channeling water over long distances across flat terrain. The requirement for a minimal but consistent slope was essential to ensure the gravity flow of water without relying on mechanical pumping systems, which were technologically unavailable or economically impractical at the time. This geographical and technical limitation further reinforced the argument that the canal project was beyond the capabilities of local labor systems, such as the hashar, and instead required extensive state intervention, detailed hydrographic studies, and the involvement of qualified specialists.

The initial design of the Amu-Bukhara Machine Canal was created by engineer A.V. Chaplygin, who created a detailed floor plan that laid the foundation for the future construction of this major hydraulic infrastructure. “A.V. Chaplygin's master plan is the initial project of the Amu-Bukhara machine canal, which was intended to fully supply the Bukhara and Karakul irrigation networks with water”²¹. Chaplygin's project was aimed at providing a full and reliable supply of water to the Bukhara and Karakul irrigation systems, which were essential for the development of the region's agriculture. His plan marked a significant shift from traditional irrigation practices to modern, mechanized

²⁰ ЦГА УзССР, ф. И-3, оп. 1, д. 108, л. 5, 42

²¹ А.В. Чаплигин, Урегулирование водного хозяйства Зеравшанской долины. М., 1925, 87-бет.



water management. The term “machine canal” refers to the use of mechanical pumps and engineering equipment to overcome natural obstacles caused by the height of the terrain and long-distance water transport.

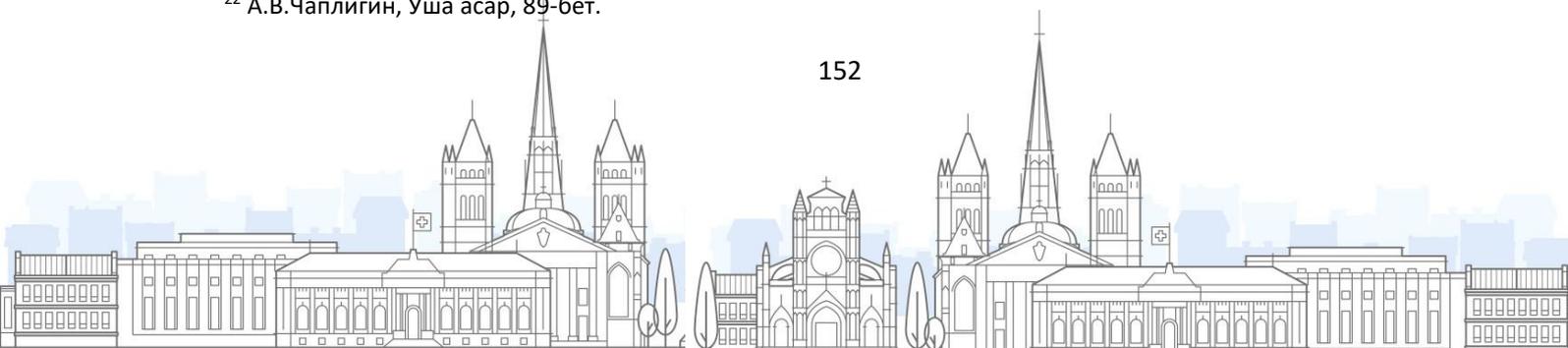
Chaplygin's project not only introduced a scientifically based approach to irrigation in Central Asia, but also marked the beginning of a large-scale effort to transform the arid steppes and deserts of the Soviet era into productive agricultural lands. The project demonstrated the increasing role of technical expertise and centralized planning in overcoming regional water shortages and expanding arable land. “According to A.V. Chaplygin's calculations, a total of 1 million 581.2 thousand cubic meters of earthworks were required to construct the Amu-Bukhara Machine Canal, including 966.3 thousand cubic meters of excavation and 614.9 thousand cubic meters of earthworks”²². These figures highlight the enormous scale of the project and the significant amount of labor, equipment, and supplies required to complete it. Chaplygin’s detailed calculations were crucial to project planning, as they allowed for more accurate forecasts of costs, labor requirements, and timelines. Furthermore, the data reinforced the argument that such a large-scale infrastructure initiative could not be implemented using traditional labor systems such as hashar and instead required mechanized means, trained personnel, and coordinated government intervention.

In short, the Amu-Bukhara Canal contributed to the regulation of seasonal water flows and reduced the risk of drought-related crop failure. In addition to its importance in agriculture, the Amu-Bukhara Canal also contributed to the growth of rural settlements by providing water for domestic and livestock needs. Overall, it was a significant achievement in Central Asian hydraulic engineering and became a key element in the modernization of the Bukhara water management system in the 20th century.

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