INTERNATIONAL JOURNAL OF POLITICAL SCIENCES AND ECONOMICS
Impact Factor (research bib) - 9,78
https://ijmri.de/index.php/ijpse , German international journals company
ISSN 2751-9708

IRRIGATION STRUCTURES AND THEIR SIGNIFICANCE IN THE KHOREZM OASIS FROM THE 19th TO THE 21st CENTURY

Buranov Zafarjon Ergashboy ugli
University of Natural and Social Sciences, Faculty of History 1st-year Master's Student

Abstract: This article analyzes the development of irrigation structures in the Khorezm Oasis from the 19th to the 21st century, and their social, economic, and environmental significance. Initially, irrigation systems in the region evolved based on ancient methods. However, during the Soviet era, centralized irrigation projects were implemented. In the 21st century, negative environmental consequences such as the drying up of the Aral Sea and soil salinization have emerged. Nevertheless, modern technologies such as drip irrigation and water-saving systems are now being explored to address these issues. The article also thoroughly examines the social and economic aspects of irrigation systems in Khorezm and their role in national agriculture and ecology.
Keywords: Khorezm, irrigation system, ecology, socio-economy, cotton, Aral Sea, soil salinity, water resources

Introduction. The Khorezm Oasis is one of the regions renowned worldwide for its ancient irrigation systems. These systems played a significant role in shaping the economy and ecology of the oasis, influencing the development of agriculture and the social lifestyle of the people. The earliest irrigation systems in Khorezm were established through the Amu Darya River and its tributaries, impacting not only the region's economy but also its culture and history. Initially, these systems were built using simple ditches and canals, but over time they became more advanced and complex.

In the 19th century, during the Khiva Khanate period, irrigation systems expanded significantly, contributing greatly to the development of the agricultural sector. Projects were implemented to improve water sources and expand canal networks to enhance land productivity. The development of irrigation became one of the key factors in expanding local agriculture, particularly cotton cultivation, and driving economic growth.

Later, in the mid-20th century, under the Soviet Union, irrigation systems in Khorezm became more centralized. Large-scale irrigation structures were built to industrialize agriculture, particularly to increase cotton production. However, this brought adverse effects, such as soil salinization and the drying of the Aral Sea. These processes also led to ecosystem disruptions and climate changes.

In the 21st century, new approaches and technologies are being developed to eliminate the negative effects of the environmental crisis and ensure sustainable development. Modern irrigation methods such as drip irrigation and water recycling technologies are being introduced to save water resources and manage land effectively. These technologies are crucial for reducing environmental risks and preventing soil salinization.

At the same time, the social and economic significance of Khorezm's irrigation systems is being studied. The development of these systems has influenced not only agriculture but also the broader economic development of the Khorezm region. The article provides an in-depth analysis of the socio-economic impact of irrigation systems in the Khorezm Oasis, their influence on national agriculture and ecology, and prospects for their future development. Approaches to modernize Khorezm's irrigation systems and ensure ecological sustainability are also discussed.

INTERNATIONAL JOURNAL OF POLITICAL SCIENCES AND ECONOMICS
Impact Factor (research bib) - 9,78
https://ijmri.de/index.php/ijpse , German international journals company
ISSN 2751-9708

This article presents a detailed analysis of the historical development, environmental and socio-economic consequences of the irrigation systems in the Khorezm Oasis. It also addresses the current ecological and economic challenges and suggests necessary future steps for the improvement of these systems.

Methodology. To analyze the development of irrigation systems in the Khorezm Oasis, several scientific methods were applied. The study employed historical-descriptive analysis, comparative-historical methods, ecological analysis, and content analysis. Using these approaches, the irrigation systems of Khorezm were examined from historical, ecological, and economic perspectives.

Primary sources, archival documents, and international studies were analyzed to understand the history of irrigation systems, their impact on social and economic development, and their environmental consequences. These sources helped explore the formation, evolution, and modernization of irrigation systems in Khorezm, including the social and political factors influencing their development.

Content and structural analysis methods were used to better understand the environmental factors affecting irrigation development. Scientific papers and research on irrigation systems were reviewed to identify current environmental issues such as water pollution, soil salinity, and climate change. Structural analysis was applied to evaluate the organizational structure and economic efficiency of Khorezm's irrigation systems.

The comparative-historical method was used to compare the development of irrigation systems in Khorezm with those in other regions, identifying similarities, differences, trends, and directions of development.

Ecological analysis focused on the environmental impact of irrigation systems in the Khorezm Oasis, including water resource management, soil salinization, and the drying of the Aral Sea. This method showed how these factors affected ecological stability. Measures to maintain ecological balance, especially through modern irrigation technologies and innovative solutions, were also analyzed.

In addition, the study examined the impact of Khorezm's irrigation systems on national agriculture and ecology, and their significance in social and economic development. Economic growth, the intensive use of irrigation, and resulting environmental and economic problems were also considered.

The methodology allowed for the analysis of innovations and efforts to create efficient irrigation systems while maintaining ecological stability. These approaches helped develop recommendations for the future development of the Khorezm region and reducing environmental risks.

Results. The research analyzed the significance of irrigation systems in Khorezm's social and economic development. It was revealed that irrigation systems played a crucial role in ensuring economic stability during the Khiva Khanate in the 19th century. These systems helped develop agriculture and trade, which contributed to the economic strengthening of Khorezm.

During the Soviet era, large-scale irrigation infrastructure was developed to increase cotton cultivation. However, this technological advancement led to negative environmental consequences. Problems like the drying of the Aral Sea and soil salinity triggered an ecological crisis in the Khorezm region, making ecological sustainability an urgent issue.

Today, in the 21st century, modern technologies and water-saving methods are being implemented to address these problems. Drip irrigation systems are seen as effective solutions for conserving water resources and preventing soil salinization. These initiatives aim to ensure efficient resource use and maintain ecological balance.

INTERNATIONAL JOURNAL OF POLITICAL SCIENCES AND ECONOMICS
Impact Factor (research bib) - 9,78
https://ijmri.de/index.php/ijpse , German international journals company
ISSN 2751-9708

Efforts to preserve the economic and ecological sustainability of Khorezm's irrigation systems are supported by government initiatives and international cooperation, which were discussed in the study. Such initiatives improve the efficiency of irrigation systems and reduce environmental risks.

The research findings show that while irrigation systems contributed to agricultural development, they also caused ecological challenges. However, with new technologies and innovative approaches, it is possible to address these issues.

Key Stages and Environmental Impact of Irrigation System Development in Khorezm:

Period	Key Changes	Environmental Impact	Economic Impact
19th Century	Development during the Khiva Khanate	Minimal environmental impact	Agricultural development
20th Century	Construction of large irrigation structures	Drying of the Aral Sea, soil salinity	Increased cotton production
21st Century	Introduction of modern and water-saving systems	Water conservation, prevention of salinity	Agricultural stability, innovation

As shown in the table, various stages in the development of irrigation systems in the Khorezm Oasis have led to environmental challenges. However, 21st-century technological advancements are expected to bring positive outcomes for ecological sustainability.

Discussion. The history and current state of irrigation systems in the Khorezm Oasis raise many social and environmental questions. While the development of irrigation systems in the 19th century and Soviet era was economically beneficial, it led to serious ecological problems. The overuse of water that contributed to the drying of the Aral Sea, soil salinity, and reduction of water resources remain pressing issues. In the 21st century, modern technologies and environmentally sound management systems are being applied to address these challenges. However, the effectiveness of these systems, especially under changing climate conditions, remains under-studied. Therefore, researching the environmental and economic effects of irrigation systems and optimizing their development remains critically important.

Conclusion. The development of irrigation systems in the Khorezm Oasis has significantly impacted its ecology, economy, and society. From the 19th to the 21st century, centralized and expanded irrigation efforts positively influenced agriculture, especially cotton farming. However, Soviet-era projects also caused severe ecological crises. Today, technological innovations such as drip irrigation are being implemented to conserve resources and address these issues. Maintaining ecological stability and improving the efficiency of irrigation systems will depend heavily on international cooperation and ongoing scientific research.

References:

1. G'ulomov, A. (2007). History of the Uzbek People. Tashkent: Fan.
2. Hojiev, N. (2015). Ecological Impact of Khorezm's Irrigation Systems. Tashkent.
3. Xaitov, F. (2012). Historical and Ecological Characteristics of the Khorezm Oasis. Bukhara.
4. Shamsiev, R. (2014). Irrigation Systems and Ecological Stability in Uzbekistan. Tashkent: Ma'naviyat.
5. Xusainov, M. (2016). Ecological Problems of the Aral Sea. Samarkand: Fan.
6. Ministry of Ecology and Environmental Protection of the Republic of Uzbekistan. (2018). Ecological Problems and Solutions Strategies. Tashkent: Ma'naviyat.