Advanced Experiments in the Use of Land-Water Resources in the Khiva Khanate and Its Environmental Significance

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Keywords: Experiment, Land, Water, Environment.

Abstract: The The article analyzes the advanced historical experiences of the use of land and water resources in the Khiva Khanate and their environmental significance even for today. In it, the authors covered the rational use of Natural Resources, artificial irrigation systems and traditional farming methods in the Khorezm Oasis. In the Khiva Khanate, the population used natural humus as fertilizer, mainly along with mineral-rich clays of Amudarya, to increase land fertility. These methods had a positive effect on ecology, helping to develop agriculture in harmony with the natural environment. Plants such as saxaul were used to stop sand migration in the area, knowing natural drainage techniques in lowering groundwater, which served to reduce soil salinity. Based on the information presented in the article, it was noted that the experience of the inhabitants of the Khiva Khanate in rational use of land and Water Resources, the targeted use of the flood waters of the even Amudarya, the issues of water conservation and maintenance of land productivity are also relevant for the current period. At the same time, the article highlights the importance of these experiments in the development of modern approaches to ecology and agriculture. This study demonstrates that the rich knowledge and traditional methods accumulated in the past are also important for the present.

1 INTRODUCTION

Natural resources are one of the foundations of the cultural development and economic well-being of countries and peoples. Therefore, the historical progress of society was in connection with the effective use of Natural Resources. The processes of globalization in recent years have also taken their toll on natural balance, and urgent problems are emerging before the world community, such as solving the issue of improving the ecological state along with the socio-economic situation on planet Earth. Of great importance is the adoption of the United Nations Sustainable Development Goals, an international document aimed at uniting efforts in this regard. Especially at the present stage of human development, environmental problems are increasingly becoming a topic of discussion among scientists, politicians, civil society institutions.

During the years of independence, the restoration, preservation, study, spiritual ownership of the historical heritage created by the Uzbek people by their ancestors was raised to the level of state policy. In the field of historical knowledge, research is carried out on various aspects of the history of the world and Uzbekistan. In this regard, one of the new directions of this field is considered the history of the environment. This direction serves to enrich the aspects of the history of Uzbekistan and its integral part of the history of Khorezm related to the relationship of “nature and society”, expand the population's knowledge of ecological culture, preserve ecology and the environment, rational use of Natural Resources, study and improve modern approaches to finding solutions to environmental problems.

In this regard, the population of the khwarezmian Oasis at the heart of traditional agriculture and water industry is revealed by the fact that the population used natural resources wisely, based on climatic and natural conditions, their knowledge of the work of continuous fertilizing, watering, crop rotation.

2 LITERATURE ANALYSIS AND METHOD

In the years of independence on the topic, a number of studies have been carried out in Uzbekistan. To

Davletov, S., Matkarimova, S., Masharipov, K. and Tajieva, U.
Advanced Experiments in the Use of Land-Water Resources in the Khiva Khanate and Its Environmental Significance.
DOI: 10.5220/0013425400004654
In *Proceedings of the 4th International Conference on Humanities Education, Law, and Social Science (ICHELS 2024)*, pages 786-790
ISBN: 978-989-758-752-8

Them I.Jabborov, H.Ziyaev, R.Ballieva, M.Jumaniyazova, Yu.Rakhmonova, U.Abdurasulov, S.Saymanov, S.Matkarimova, N.Kamolova, M.Karlibaev, S.It is possible to include the work of Suleymanov and others. They analyzed the issues of land ownership in the Khorezm Oasis, Land-Water relations and other aspects.

The role of modern foreign research is also important in this regard. Among the works belonging to this group, foreign specialists-scientists C.Becker, J.Zeiss, E.Brit, P.Sartori, K.Bichsel, V.Naumkin, E.Burnakova, U.An example can be made of juzbaeva and others. The issues reflected in their research are in accordance with the goals set by the authors to their forefathers, and within them are also references to certain aspects of the use of nature. For example, the American scientist s.Of importance is Becker's work dedicated to the Khanate of Khiva and Bukhara, in which aspects of economic growth in the Khanate are embodied using materials on the agrarian life of Khiva [1].

V.In Naumkin's fossil dedicated to Khiva, it can be observed that there is evidence to substantiate aspects related to the nature of the Khiva Khanate and the issues of its use [2].

J.Irrigation and agricultural life in the Khiva Khanate was studied in the Zeiss studies using the example of 1768 – 1914. The author covered the transformation and continuity of irrigation farming in the Khiva Khanate in the periods before and after the invasion of the Russian Empire of 1873 [3].

E. In his study, Brit made a comparative analysis of two irrigation periods in the Khorezm Oasis, the first ancient and the second modern systems. In the opinion of the author, distinctive features in historical periods were considered an important influencing factor for environmental stability and human well-being [4].

In the preparation of this article, based on the method of historical-comparative analysis, a study was carried out using the results of historical sources, in particular documentary materials, as well as scientific literature, modern research.

3 DISCUSSION AND RESULTS

The centuries-old culture of land cultivation of the peoples of Central Asia was primarily based on artificial irrigation. Traditional and forgotten methods of land and water use in the region have adapted to climate change.

The soils of the Khorezm Oasis are mainly composed of alluvial deposits of the Amudarya. In the composition of this soil, the fact that the climate is sharply Continental, the air is dry, and human economic activity has served as an important factor. The fertility of the soils in the Oasis area was not very high, but the turbid and various mineral salts brought by the river greatly increased the fertility of the soil. Amudaryo's kayaks and Kohna kayars have grassland, gravelly-marshy soils over alluvial deposits, and swampy soils in the weirs. Weaving plants have been found in large numbers in amudarya kayirs. Shrubs and grasses such as poplar, willow, jiyda, nettle trees, yulghun, kandir, chiy, quagha, Birch, etc. The fact that poplar and smoke-free nails were made for ships was recorded in the memoirs of 19th-century authors [4, 49].

One of the rare parts of the nature of amudarya weaving was dates. The webs contained a wide variety of natural vegetation, reedbeds, especially in abundance. In areas with gravelly soils of the OASIS, a succulent plant was found in rye, wheat, acorns and sandy areas, and in the salty lands-a succulent plant. The Saxons slowed sand migration. Therefore, the establishment of ixota Groves has also long been considered important in maintaining the fertility of agricultural lands [6, 38-39].

By the 11th century, the main type of Agriculture in Khiva had become composed of wheat. A lot of information on the fact that a rich harvest of wheat was obtained was recorded in the archival documents of the Khiva Khanate [7]. More than half of the arable land was earmarked for wheat and oats, and about a fifth was earmarked for cotton. Barley, rice, flax, sesame, melon and watermelon were planted in the rest of the land. Residents have also grown Sesame, a crop that requires little water in its fields. This plant species was widely used by craftsmen who took oil and in confectionery. N who was in the city. Muravyov (1819) noted that in Khiva “they consume incomparable sesame oil” [8, 87].

Residents also planted the rootstock and produced red dye from its root. This plant was grown in 3 years. The roots are taken, washed, dried, milled, sifted Gan til boil in pots. The annual Root was better, but gave little paint [5, 25].

Although horticulture plays a much smaller role in agriculture, but Oaks, peaches, vines, apples, pomegranates, pears and other fruits have also been grown in Hiva Gardens [9, 18]. 1819 in Khiva n. Muravyov wrote about the country's gardening, noting that Khiva is devoid of forests by nature, but has a huge abundance of fruits, sweet and health-beneficial Gardens, which are overflowing with the labor of the population [8, 87].

In the Khorezm oasis, from time immemorial, there was also a lot of cultivation of cereals. Sesame and flax, melon from melons crops, watermelon, pumpkin, carrots, onions occupy wide areas. Khiva melons have been world famous for many centuries. Farmers knew that these melons grew well on loamy soil and reached the peak of sweetness only if they were allowed to ripen during periods of low rainfall. Historical sources record that these melons, which formed the bulk of Khiva's exports, were wrapped in special paper made of dice and transported to distant lands [11, 334].

The khwarezmian gourd was sent to France in the 1890s with large Caravans through Orenburg and used to make the best quality cognacs exported to Russia. Academic N.I.Vavilov estimated in 1928 that the average weight of Khwarezmian melons was 10-14 kg.having determined the equivalent of, Khwarezmian melons are recognized as unequal in the world in size, sugar, flavor, long storage, long Transport [12, 7].

Khwarezmian farmers have long developed complex methods of crop rotation, which allowed them to process the soil almost continuously during the growing season without rapid exhaustion. A number of tourists have reported on the ability of Khorezm farmers to crop alternately to get the maximum benefit from their fields without losing productivity.

The high water of amudarya was one of the main sources of productivity in Khorezm. Amudarya is known for its muddy nature, and its floodplains have accumulated a large amount of fertile soils. There is reliable evidence that the main fertilizer of the grazier khwarezmians was humus. Local humus is still the most environmentally friendly and effective way to enrich the soil to improve plant growth.

One of the Russian authors noted the practice of applying fertilizers in Khorezm, “... he noted that instead of manure, on some lands they prepared fertile fertilizers from a mixture of dry grass, sometimes ash and other things with the remains of housing estates”[13, 210].

Indeed, it is noteworthy that when talking about a farming culture that represents the productive use of land resources by the inhabitants of the Khanate, the population prepared fertilizer-ointments for the fields in the autumn and winter seasons in order to increase soil fertility. To do this, somewhere around two meters of sand was thrown. Then the local fertilizer, the soil standing in the sun, was mixed several times. This ointment was prepared in 500 carts, sometimes even more. In general this method, fertilizer preparation work could be carried out at any time of the year. It was also used to trade fertilizer. KHiva had a large fertilizer trade, and landowners purchased the fertilizer and spread it to their fields from the beginning to the middle of spring.

All irrigated fields in the region received water from the Amudarya, the river transported large amounts of mud, and thus a layer of mud settled in the fields irrigated annually. In addition, fertilizers applied on arable land also contributed to the strengthening of the cultural and irrigation layer of the soil. To increase the yield of fields, farmers carried out special measures that were formed over the centuries, that is, sand mixed with soil and manure from the lands of old buildings was thrown into the fields. In this, manure was fertilizer, and sand improved the physical properties of clay soils. 22% of the working time spent by farmers during the entire agricultural period went to fertilize the land [14, 200]. Thus, irrigation water was involved in the creation of a cultural-irrigated layer of soils, on the one hand, the peasant himself on the other.

Foreign experts have noted that during the study period, the level of productivity of Khwarezmian agriculture is sharply different compared to the average productivity in other regions of the world. Fertilizing and irrigation, using high seeding standards, Khwarezm farms in the years when farming came well every acre[acre (Eng. acre) is a unit of surface in the English system of measurement. 1 A. = 4840 sq. yard = 4046.86 m2.] 36 to 42 bushels from the ground[Bushel (Eng. bushel) is a measure of volume of liquids and solvents. It is mainly used in England and the USA. 1 B. = 36.4 l. (In England); 1 B. = 35.2 l. (In the US).] up to harvest. The average yield per acre of land in Khiva was at least 30 bushels. In 1900, the average yield of wheat in only 4 states in the United States exceeded 20 bushels per 1 acre of land, while one-third of the states had half that [15, 22].

The Russian zoologist scientist Bogdanov had great respect for the inhabitants of the Khanate, highly appreciated their skill and laboriousness, because of this, the Agriculture of the Khiva Oasis was at a high level. “These peaceful desert cultivators did not destroy anything in nature, "wrote modest Nikolaevich," but enriched the local fauna. They were not mistaken in choosing a place. It took a lot of work to turn the lifeless Tair lands into a flourishing Oasis, now surrounded by arid deserts, Sandlands, this area is the most suitable places for farming, horticulture, winemaking and silkmaking in terms of its productivity and healthy climate” [16, 132]. Similar information is given in large numbers in the materials of the authors of the XIX century.

In conditions of water scarcity, specific methods of preparing, fertilizing and watering land in the Oasis have been formed. In particular, the preparation of the field for cultivation began with the leveling of the surface of the earth, that is, the hills of the earth are plowed and the swamps are filled. For more convenient irrigation, it is divided into separate small areas separated from each other by soil ridges. Then the field was washed with salt several times in a row by repeated watering. The soil, especially during the first irrigation, quickly absorbed the water and dissolved salts surfaced. Thus, the layer in which the plant roots mainly develop is cleaned. A method of draining (draining) water to the other side, saturated with salt and not yet having time to be absorbed into the soil, was also used.

In the context of the Khorezm Oasis, there has long been a tradition of breeding gujum and willow trees due to the proximity of the waters of the erosti (sizot). The roots of these trees pulled the sizot into the underlying layers of the Earth, which, in addition to improving the reclamation, gave a large amount of wood product, and for building it was an important resource. In particular, the resistance of gujum Wood to different conditions was taken into account [17, 124]. Under the shade of cersoia and the exotic gujum tree, the temperature of the basin decreased. The gujum tree is suitable for the hot and dry climate of Khiva, and because it also feeds on salt water, in 50 degrees of heat, the temperature in its shade can drop to 35 degrees.

The rich experience accumulated over many years in irrigation work has made it possible for local residents to create complex water management techniques and develop certain skills in its implementation. As a result, in the process of long Progress, a kind of irrigation technique arose, gradually moving from the simplest methods of water extraction mechanisms to much more complex ones. While in Khorezm the simplest ways to extract water from canals to fields were "sepma", "depma" and "Nova", the so-called "Pig" ancient water outlet has become the most "improved" method.

Another feature of the Khanate's natural conditions is the issue of flooding in the river. These events, on the one hand, necessitated the adoption of measures to protect the fields in agriculture, and on the other, encouraged the productive use of it in the irrigation of land areas in conditions of water scarcity. The water of amudarya was flooded several times a year. As these floods coincided with a time when crops needed water, local farmers compiled a flood calendar based on centuries of experience. Therefore, there were also special people in the Khorezm Oasis who knew when the river flood began and told how the river flow changes [18, 32]. According to their calendar, irrigation farming in the oasis (during the growing season of the crop) was based on 4 Floods of the Amudarya: 1) Blue cane; 2) white fish; 3) star; 4) forty chiles.

In particular, the "Blue Reed flood" (late March), that is, in the lakes, begins at the moment when the Reed has just sprouted. Depending on the rate of growth of the Reed, the flood has been found to be timely or delayed. In mid-April, Whitefish began to cross the Island Sea into the upper reaches of the Amudarya. It is said to be a" Whitefish Stingray". The "starburst" (mid-may) is designated by the time of appearance of the Hulkar constellation. The "forty-childish rash" (summer chilla) began in the second half of June and lasted up to 40 days. If the floods were delayed or not at all, it alarmed the whole country and signaled the destruction of the farm [19, 305]. During the winter months in the Khiva Khanate, ice formed in large channels, Lakes, was crushed and buried in one place in a very large volume, with soil after covering the top. Such fragments of ice in garams were used as a source of coldness during the summer period. The environmental advantage of this is that the ice has reduced the environmental heat in the summer during the melting process.

It is known that salt water, when freezing, is squeezed out by its salt molecules, ice crystals. As a result, when the ice dissolves, fresh water is formed. Therefore, the ice formed during the winter period served as a source of fresh water and coldness during the summer [20, 26].

4 CONCLUSION

The rich experience accumulated over many years in the use of land and water resources in the Khorezm Oasis made it possible to create a complex water management technique and introduce it, to form a certain skill in the formation of ground handling technology. In conditions of water scarcity, specific methods of preparing, fertilizing and watering land in the Oasis have been formed.

In the Khiva Khanate, humus served as the main fertilizer. In addition to humus, in some cases, household residues, ash mixture also served as fertilizer. It should be noted that the rich experience accumulated by khwarezmian peasants during a long historical period in irrigation work made it possible to create complex water management techniques.

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