

NATURAL, CLIMATIC AND ECONOMIC FACTORS OF RICE DEVELOPMENT IN KARAKALPAKSTAN

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Abstract: This article comprehensively studies the natural-geographical, climatic and economic factors affecting the development of the rice growing industry in the Republic of Karakalpakstan. The article analyzes the potential of natural-climatic conditions for rice growing, such as fertile alluvial soils, water resources, temperature, sunlight and humidity during the growing season, typical for the Amu Darya delta regions of the region. It also highlights the impact of factors such as water scarcity, soil salinity, and climate change on the efficiency of the industry in recent years.

Keywords: Karakalpakstan, Amu Darya Delta, horticulture, rice cultivation, natural factors, climatic conditions, agroclimatic resources, soil conditions, water supply, irrigated lands, soil salinity, ecological factors.

Annotatsiya: Ushbu maqolada Qoraqalpog'iston Respublikasida shullikchilik (sholi yetishtirish) tarmoğinin rivojlanishiga ta'sir etuvchi tabiiy-geografik, iqlimiy hamda iqtisodiy omillar kompleks o'rganiladi. Mavzuda mintaqaning Amudaryo deltasida hududlariga xos bo'lgan unumdor allyuvial tuproqlar, suv resurslari bilan ta'minlanganlik holati, vegetatsiya davridagi harorat, quyosh nuri va namlik rejimi kabi tabiiy-iqlimiy sharoitlarning shullikchilik uchun imkoniyatlari tahlil etilgan. Shuningdek, so'nggi yillarda suv tanqisligi, tuproq sho'rlanishi, iqlim o'zgarishi kabi omillarning tarmoq samaradorligiga ta'siri yoritib berilgan.

Kalit so'zlar: Qoraqalpog'iston, Amudaryo deltasida, shullikchilik, sholi yetishtirish, tabiiy omillar, iqlim sharoiti, agroiklim resurslari, tuproq-sharoit, suv ta'minoti, sug'oriladigan yerlar, tuproq sho'rlanishi, ekologik omillar.

Аннотация: В статье комплексно исследованы природно-географические, климатические и экономические факторы, влияющие на развитие рисоводства в Республике Каракалпакстан. Проанализирован потенциал природно-климатических условий для выращивания риса, таких как плодородные аллювиальные почвы, водные ресурсы, температура, освещённость и влажность воздуха в вегетационный период, характерные для дельтовых районов Амударьи. Также отмечено влияние таких факторов, как дефицит воды, засоленность почв и изменение климата, на эффективность развития отрасли в последние годы.

Ключевые слова: Каракалпакстан, дельта Амударьи, садоводство, рисоводство, природные факторы, климатические условия, агроклиматические ресурсы, почвенные условия, водоснабжение, орошаемые земли, засоление почв, экологические факторы.

INTRODUCTION Karakalpakstan, with its unique natural and climatic conditions and economic potential, has great potential for the development of rice cultivation. The region's climatic conditions, land resources and water sources create a favorable environment for rice cultivation. Firstly, the climate of Karakalpakstan is characterized by high temperatures and long sunny days in the summer months.

This provides the heat and light necessary for the growing season of rice. Secondly, the land resources available in the region include large areas suitable for rice cultivation. In particular, the fertile soils of the Amu Darya delta contribute to increasing rice productivity. Despite this, the area under rice cultivation has decreased.

The dynamics of rice cultivation in Karakalpakstan before the establishment of state farms specializing in rice cultivation show that rice cultivation has changed over the years. Between 1928 and 1940, the area expanded significantly, from 4.4 thousand hectares to 10.9 thousand hectares. This increase indicates the growing importance of rice in agriculture.

However, the situation changed in the following decades. By 1950, the area under rice was 74 percent of the 1940 level, and by 1955, it was 61 percent. This reduction may have been due to a number of factors, including limited water resources, inadequate agrotechnical methods, and a shift to other crops. The data for the Karakalpak ASSR for 1955 are a starting point that reflects the state of rice cultivation before the era of large-scale specialized state farms. With a low yield of 6.5 quintals per hectare and a gross harvest of 4.3 thousand tons, only 9,555 kg of rice raw material was supplied to 450 thousand people per capita¹.

There were also a number of economic factors that contributed to the development of rice farming in Karakalpakstan. In particular, the experience and skills of the region's population in agriculture, as well as their interest in mastering rice cultivation technologies, created an important foundation for the development of this sector. In addition, state support for agriculture and the provision of modern equipment helped to increase the economic efficiency of rice farming.

G.P. Kozlov, who studied the rice-growing state farms of the Karakalpakstan ASSR, highly assessed the natural-climatic and economic factors of rice-growing development in the region:

The main land fund suitable for development (61.6%) is located in the northern natural-economic zone. The leading commodity sectors of agriculture in the Karakalpakstan ASSR are cotton growing, livestock breeding and rice growing. Based on a statistical study of the current state of agriculture and an analysis of the main natural factors (climatic, hydrological and soil-ameliorative), a rational specialization of agriculture in the natural-economic zones of the republic was determined... A large rice-growing massif is being created in the northern natural-economic zone, according to the general plan for the organization of the territory, rice farms here occupy 33.4 percent of irrigated land"².

The scientist noted that it was necessary to rationally specialize agriculture in the natural and economic regions of Karakalpakstan. In this case, it was necessary to take into account the specific characteristics of each region, namely, climatic conditions, hydrological and soil-reclamation conditions. The development of rice cultivation in the northern region was the result of such rational specialization.

Rice productivity was extremely low until the 60s. In 1955, 6.5 quintals of rice raw materials were obtained from each hectare of sown area. True, in 1955-1960, the productivity increased slightly and in 1960 it was 15.4, and in 1961 - 18. 8s/ha. But its overall level did not correspond to objective possibilities³.

¹ Палванов Дж. Создание материально технической базы интенсивного рисоводства в Каракалпакской АССР. Нукус: «Каракалпакстан», 1983. – 98-99 с.

² Козлов Г.П. Внутрихозяйственное землеустройство рисоводческих совхозов Каракалпакской АССР. Автореф. дисс. на соискание уч. степени кандид. экономических наук. Ташкент, 1968. – 9 с.

³ Палванов Дж. Создание материально технической базы интенсивного рисоводства в Каракалпакской АССР. Нукус: «Каракалпакстан», 1983. – 97 с.

In Karakalpakstan, rice cultivation was considered a new commodity branch in the lower reaches of the Amu Darya. The administrative-command system of state administration at that time considered that our region had large natural and economic resources. The area of land suitable for irrigation in the autonomous republic was 1 million 645 thousand hectares. More than 23 percent of the vacant arable land is located in the northern region of Karakalpakstan, where soil and climatic conditions were considered favorable for rice cultivation.

Rice is an important crop among cereals, distinguished by its productivity and stability. When water supply is sufficient, it creates a unique microclimate, which helps to mitigate the effects of even drought. In addition, rice is less susceptible to pests than other cereals. Planned work on rice cultivation in the region began in the 1960s. In 1957, its cultivated area amounted to 2.6 thousand hectares.

The Karakalpakstan ASSR has rich land resources. Although more than 1,645,000 hectares of land are suitable for irrigation, only 253,000 hectares of it are used for crops and seedlings. About 2/3 of the vacant arable land is located in the northern part of the autonomous republic, where the soil and climatic conditions are favorable for rice cultivation.

In the 1950s, the northern rice-growing region included such administrative districts as Kungirat, Chimboy, Takhtkopir and Muynak. This region is characterized by much more unfavorable natural conditions compared to the southern regions. In order to accelerate production and continuously increase rice yields, the task of creating new varieties adapted to the soil and climatic conditions of the autonomous republic was set.

In Uzbekistan, rice was grown in the South Aral Sea and along the Syrdarya River. The Karakalpak ASSR and the Khorezm region are also considered rice-growing areas. As you can see, all of this is concentrated in the desert region. As in Kazakhstan, Koreans played an important role in the development of these previously unusable lands⁴.

Research and development work on rice cultivation is poorly organized, as a result of which insufficient attention is paid to preliminary exploration work carried out at the facilities being designed for water management construction. Therefore, when drawing up land reclamation projects, there is no possibility of developing a number of options for technical solutions that would justify the efficiency of capital investments, while when choosing the most economically advantageous option, it is necessary to pay attention to such key indicators as the cost of production, the relative costs of funds per unit of area or unit of product, and payback periods, which would allow establishing a correct system of technical and economic calculations that would comprehensively characterize the selected options, taking into account the specific characteristics of the agricultural sector being designed. In this case, there will be no cases of understating some indicators of the efficiency of capital investments and overstating others⁵.

According to Dzh. Palvanov, the type of rice at that time did not correspond to the weather conditions of the region and caused an inconvenient situation when the crop fell to the ground after ripening: For example, although the UzROS-59 variety has a relatively high yield, it has a high level of lodging before harvest. In addition, this variety is considered late-ripening and does not fully ripen in all years. Currently, this variety is zoned in the southernmost regions of Central Asia (in the Surkhandarya, Kashkadarya and Khorezm regions of the Uzbek SSR) where the sum of effective temperatures is more than three thousand degrees, as well as in the northernmost regions of the region (in the Karakalpakstan ASSR) where the sum of effective temperatures is around two thousand degrees. Therefore, breeders are faced with the task of

⁴ Хан В. С., Сим Х. Ё. *Корейцы Центральной Азии: прошлое и настоящее*. – М.: Изд-во МБА, 2014. – 107 с.

⁵ Нурманов А. Н. *Мелиорация засоленных земель в современной дельте реки Аму-Дарьи*. Нукус «Каракалпакстан», 1973. – 159-160 с.

creating varieties that are adapted to the soil and climatic conditions of the lower reaches of the Amu Darya, have high yields, and have improved rice quality”⁶.

Therefore, in order to develop rice cultivation in Karakalpakstan, it was of great importance to create new varieties that are adapted to local conditions, ripen in a short time and give high yields. The creation of such varieties, on the one hand, would increase productivity by adapting to the climatic conditions of the region, and on the other hand, would facilitate harvesting processes and reduce crop waste.

In this context, important tasks such as the development of irrigated agriculture in the Aral Sea region, the elimination of existing problems in land development, the rational use of water resources, the improvement of the land reclamation situation, and the development of infrastructure were faced. Successfully solving these tasks would contribute to the socio-economic development of Karakalpakstan, improving the living standards of the population, and ensuring the food security of the region.

The development of rice cultivation in Karakalpakstan required the interrelated solution of many factors, such as the land development complex, soil and climatic conditions of the region, rational use of water resources, the creation of new varieties and the development of infrastructure. Successfully solving these tasks would make a significant contribution to the economic development of the region.

The initial development of lands for irrigated agriculture in the Karakalpak ASSR is carried out in difficult soil and climatic conditions. The newly developed areas do not have water sources, a road network and other household conditions for the developers. The Aral Sea Development Region, which covers an area of about 1 million hectares, is located far from developed areas⁷.

In addition, the remoteness of the newly developed lands and the lack of infrastructure made the development process difficult. Therefore, it was important to create the necessary conditions for developers, build roads, improve water supply, and create other household conditions.

It draws attention to the assessment of the resources of rice-growing regions and the justification of the place of each of them in ensuring the country's need for this food product. The place of the Karakalpak ASSR among other rice-growing regions of the USSR is based on climate, land and water resources.

It is necessary to have sufficient and controlled water sources throughout the entire cultivated area that can provide an optimal water regime in rice fields. Therefore, one of the most important factors for the development and acceleration of the industry in the rice-growing region is the presence of a freshwater river, that is, a natural source of irrigation water. The rice-growing regions of the country are mainly located in agro-climatic regions provided with sufficient heat resources. There are certain geographical boundaries within which promising rice cultivation can be established.

The climate of Karakalpakstan is also very suitable for growing rice. The hot, long summer days and the abundance of sunlight allow rice to develop well and yield a harvest. However, it should not be forgotten that there are also problems here, such as soil salinity and water shortage.

Thus, the Karakalpak ASSR had sufficient natural conditions for the development of rice cultivation. However, high results in the field could be achieved only by rational use of these conditions and the elimination of existing problems. This required the use of scientifically based agrotechnical measures.

⁶ Палванов Дж. Создание материально технической базы интенсивного рисоводства в Каракалпакской АССР. Нукус: «Каракалпакстан», 1983. – 142 с.

⁷ Палванов Дж. Рисовый комплекс Каракалпаки. Нукус: «Каракалпакстан», 1977. – 219 с.

Determining the optimal northern limit of rice cultivation is one of the main issues of scientific and project development. For this purpose, the necessary materials were collected on the climatic characteristics of the regions where rice can be grown and the biological requirements of different rice varieties for heat. Scientific research was carried out both in the direction of selecting future rice growing regions according to their soil and climatic resources, and in the direction of creating new early-maturing and temperature-resistant rice varieties. The goal was to expand the geography of cultivation of this thermophilic, valuable food crop of tropical origin in our country⁸.

As indicated, rice cultivation in our country began to develop as one of the leading branches of irrigated agriculture only in the 1960s. This period is too short for the development of new intensive production technologies (production agrotechnics) and fundamentally new types of agricultural machinery, relative to the formation and development of a new commodity branch of agriculture.

Rice is an important crop for people living in tropical and subtropical climate regions. In these regions, conditions are created for rice as a plant that meets its requirements for temperature, light, moisture supply, and the length of the growing season. Rice is the second most important cereal crop after wheat⁹.

A new promising branch of the republic's agriculture was rice farming. As before, great attention was paid to livestock breeding. 37 large collective farms and 53 state farms (9 of which were rice-growing and 5 were livestock-breeding) operated in the republic. Thus, both branches of agriculture - rice farming and livestock breeding - were of great importance in the economic development of the republic, and their interdependence and complementarity served to increase the well-being of the population of the region.

However, the names of the agricultural workers of that time, heroes who are still remembered today, are inscribed in the golden pages of the history of Karakalpakstan. They are people who made a huge contribution to the prosperity of the country with their work and are an example for future generations. For example, during the Sixth Five-Year Plan, during the seven years of the Sixth Five-Year Plan, thousands of workers of the republic were awarded orders and medals for achieving high performance in industry, as well as in cotton and rice cultivation. Fisherman Ayap Nazarkhanov, cotton growers Amangul Saparboyeva, Aim Kachalova, Abajan Durdiyev, rice grower Uteniyaz Turumbetov and others were awarded the high title of Hero of Socialist Labor.

This period, undoubtedly, left a unique mark in the history of Karakalpakstan. The successes achieved during the sixth five-year and seven-year plans were not only economic growth, but also a vivid example of the hard work and dedication of the people. The awards of orders and medals to workers who achieved high performance in industry, cotton and rice cultivation are a clear proof of this. The awarding of the title of Hero of Socialist Labor to heroes such as Sholikor Uteniyaz Turumbetov was the highest recognition of that time.

However, it is also worth noting that behind such achievements lay a complex policy of centralized planning and imbalances in the use of resources. The continuation of the monoculture policy, the main focus on cotton and rice cultivation, limited the development of other sectors. Environmental problems, in particular, the consequences of the drying up of the Aral Sea, also have their roots in this period.

⁸ Палванов Дж. *Создание материально технической базы интенсивного рисоводства в Каракалпакской АССР*. Нукус: «Каракалпакстан», 1983. – 49 с

⁹ Даффа Адама. *Проблемы интенсификации производства риса в странах Сахеля с применением опыта хозяйств Краснодарского края*. Автореф. дисс. на соискание степени канд экон. наук. Москва, 1989. – 3 с.

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