



## Article

# Using Local Kazakh Camels from The Gene Pool and Preserving and Restoring The Ecosystem of The Aral Sea Region

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**Abstract:** This article studies how the Kazakh camel production maintains a bond with its preservation system since it drives environmental sustainability with social growth and economic security. Growth in camel breeding creates job prospects that simultaneously boost the development of rural communities through combining traditional farming methods with contemporary industry requirements. Research shows that preserving Kazakh camels and their environment depends on local farm participation because these animals generate most of the income in dry areas. The disappearance of these animals creates three serious environmental consequences because it threatens biodiversity while shrinking genetic resources and eliminates an important aspect of national conservation heritage. The study shows the need to create integrated plans which unite monetary rewards with nature preservation for achieving enduring sustainability. The protection of delicate ecosystems and assessment of ecological stability and community resilience against desertification and climate change challenges can be achieved through controlled camel breeding practices.

**Keywords:** camel breeding, conservation of biodiversity, camel products, desertification, ecosystem of the Aral Sea.

## 1. Introduction

In the context of growing environmental problems, the preservation of biodiversity is becoming an important task for ensuring sustainable development. Kazakhstan, with its unique natural resources and ecosystems, plays a key role in the conservation of species adapted to extreme conditions. One of these species is the Kazakh two-humped camel (Bactrian), which is not only of great economic importance, but also helps maintain the ecological balance in the Aral region.

Camel breeding is a traditional branch of animal husbandry in Kazakhstan, especially in arid areas. However, in recent decades, the number of local Kazakh camels has decreased, which is associated with socio-economic and environmental changes. Disruption of the Aral Sea ecosystem has led to pasture degradation and a decrease in agricultural productivity, which, in turn, has affected the standard of living of the local population. Despite the high demand for camel products (meat, milk, wool), the industry faces problems of insufficient government support and declining interest from farmers.

Previous studies focused mainly on the productive characteristics of camels and their adaptation to various climatic conditions. However, the relationship between camel breeding and the restoration of the Aral Sea region ecosystem remains understudied. This study aims to identify the ecological and economic significance of preserving Kazakh camels and developing comprehensive measures to develop this industry in the context of environmental change.

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The work uses field research methods, statistical analysis and comparative study of literary sources. It is expected that the results will help to identify the most effective strategies for preserving the Kazakh camel population and their habitat.

Thus, this study has not only scientific but also practical significance, since its results can be used to develop programs for sustainable agriculture, ecotourism and state support for traditional livestock farming. The restoration of camel breeding in the Aral Sea region will be an important step in preserving biodiversity and improving the socio-economic situation in the region.

## 2. Materials and Methods

In the conservation of biodiversity, Kazakhstan occupies a special place in the global context, as it is the ninth largest country and almost equal in area to the territory of Western Europe. Kazakhstan surpasses four neighboring Central Asian countries due to the diversity of natural conditions, ecological systems, biological species, as well as enormous research potential and a large number of scientists conducting research in the field of biodiversity.

In recent years, the environmental situation in the Aral region, which is part of the Kyzylorda region, has worsened. The climate is changing dramatically, the drying up of the Aral Sea bed increases the release of salts and dust, the groundwater level rises, gardens are dying, the soil structure is destroyed, fertility is decreasing, the condition of pastures is deteriorating, mortality is increasing and the number of animals is catastrophically decreasing.

Camel breeding is the leading and historically established traditional branch of animal husbandry. Natural weather conditions, especially the abundance of deserts and desert lands, create favorable conditions for its development. The development of camel breeding is also facilitated by the features of pasture lands. For more complete and efficient use of low-productivity pasture lands, it is necessary to develop camel breeding.

Currently, only a few regions in the country are engaged in camel farming. In this case, camels are better adapted to the nature of the Turkestan, Mangistau and Kyzylorda regions. In desert and semi-desert places, camels, which do not drink water for weeks and eat bitter herbs, do not need special care. Basically, 58,643 camels are bred in the Kyzylorda region, most of which are in the farms of the Aral region. That is, in the Aral Sea region there are 33,305 heads of the Oysylkarin breed. Because the bitter, saline grass of the Aral Sea region, where the soil is salty, semi-desert, is an indispensable food for camels. Here in the mid-eighties, camel farming began in the region. In one farm, the number of camels increased to 1500-2000 heads. In those years, there was a great demand for meat, milk, and wool of camels. Thanks to this, camel farming became profitable and achieved great success. Camel down has a high price abroad. This is because camel wool is very warm. Therefore, clothes and blankets made from it are sold at an inflated price. And in our country, there is also a demand for its wool, meat, and milk.

## 3. Results

In Kazakhstan, the domesticated Bactrian camel is more common. In some regions, it is called the "two-humped camel", and the inhabitants of the Caspian and Aral regions call it the "colored camel". The wild type of Bactrian camel is called "Kaptagai". The female humped camel is "ingen", the male is "bura". The Bactrian camel is scientifically called "Bactrian". Its body is large, the weight can reach 450-690 kg. Currently, the Bactrian camel has three domesticated species. These are the Kalmyk, Kazakh and Mongolian species. The Kazakh Bactrian camel is widely bred in Kazakhstan. It is well adapted to the natural conditions of arid steppe, desert and semi-desert areas. It is resistant to heat and frost. Lives in Mangistau, Atyrau, West Kazakhstan, Aktobe, Kyzylorda, Zhambyl, Almaty, and some areas of East Kazakhstan.

Very harsh climatic conditions have created a unique ecosystem with specially adapted species. Kazakh camels are one of the striking examples of adaptation to the conditions of this ecosystem. Conservation of species "Kolshatyr" is a tool for the transition from the conservation of single species to the management of the ecosystem as a whole. Effective conservation of Kazakh camels requires the conservation of their habitats, in particular, the Aral Sea ecosystem, of which they are an integral part.

The main advantage of breeding these animals is the production of high-quality milk and dairy products of complex composition, ensuring human health.

Camels are superior to all animal species in their biological characteristics, they not only tolerate high and harsh temperature conditions of the desert (from +50 to -50 degrees), but also consume less water and food. Dehydration is not as dangerous for camels as it is for people.

A person who has lost 12% of body fluid dies, and an adult camel can lose 27% of body fluid and survive. A feature of camel adaptation to water deficiency is the change in their body temperature during the daytime depending on environmental conditions with a change of plus or minus 6-8 degrees. It has been found that the position of the body in relation to the sun helps them regulate body temperature at high temperatures.

Preservation of biodiversity in individual ecosystems is of global importance for all of humanity, since it can bring environmental, economic and socio-cultural benefits at the national, regional and global levels.

Recently, the main industry of the Aral Sea region - camel breeding has completely collapsed, which has led to an increase in unemployment and an exacerbation of all social problems in the village.

A serious problem is that local residents do not find pastures for breeding camels and sell them for meat to meet their economic needs.

In addition, the real danger is not only the catastrophic reduction in livestock, which immediately affects the ecosystem near the Aral Sea, but also affects the local population, since camels are the main source of nutritious food (milk, meat, butter, cheese, etc.) here. Therefore, the preservation of local Kazakh camels is not only of national importance, but is also a solution to the problems of global biodiversity and desertification.

On the basis of the farming enterprise TOO "Kulandy" it is proposed to implement a demonstration project of a dairy farm with the participation of local residents of the villages of Kulandy, Akbasty, Kosaman of the Aral region, the main goal of which is the preservation and reproduction of the population of Kazakh Bactria using natural rich protein in food production.

The two components of the project - the production and preservation of the Kazakh camel - are interconnected and are an example of an integrated approach to solving environmental problems. In the course of expanding production in the social and economic spheres of life, it is expected to increase employment of the local population and create new jobs.

Based on the above activities, we plan to interest local farms in the preservation of Kazakh camels and the ecosystem of their habitat as the only source of livelihood. The loss of any breed of domestic animals is not only a reduction in the gene pool of the planet and the loss of its diversity, but also the loss of one of the components of the national heritage of the republic, because each of them is a living monument of the culture and civilization of the people who created it and preserved it to this day, a monument measured in ancient millennia. By using Kazakh camels of the "Kolshatyr" species as project indicators, we will preserve the ecosystem of the Aral region as a whole.

It has been known since time immemorial that camel milk is shubat, food and drink. Along with these properties, it should be known that it has healing properties against some diseases, especially tuberculosis and stomach diseases.

It is known that, in addition to meat and milk, camel wool is also of very high quality, since according to technological properties it is light, warm and durable.

One of the biological features of the camel is its resistance to severe winters and desert heat, and it is also much better than other animals in terms of water and pasture use.

The camel is a grazing animal, it feeds at night and digests food during the day. It feeds on weeds, wormwood, herbs, legumes - cereals and shrubs. Compared to other animals, the camel has a particularly developed digestive tract, chest and legs, and it is very resistant to the waterless and changeable weather of the desert. One of the main features of the camel is its ability to quickly stock up on natural pastures and accumulate fat in the amount of 1120-150 kg.

This fat is a source of energy reserves, which is used during severe winter storms and summer droughts, as well as in the absence of water.

In winter, the camel's skin becomes thick, which protects it well from the severe winter cold. In the spring, the wool sheds and falls out, in the heat it does not sweat.

Loss of water in the camel's body is not dangerous for it. For example, due to the release of moisture, a camel weighing 630 kg can lose 27 percent of its weight (more than 160 kg) and survive, since a significant proportion of liquid remains in its blood.

It should be noted that camels do not tolerate strong winds and high humidity inside the pen. For example, the one-humped Turkmen camel feels good in hot places of the desert and desert regions of Kazakhstan and Central Asia, and the two-humped Kazakh breed of camels can show abundant productivity characteristic of this breed both in such hot and in winter frosty places.

The presence of two different breeds of camels with biological characteristics provides a full opportunity to select them for growing in a well-adapted zone.

The main task of farms, specialists and employees of institutions engaged in camel breeding should be a constant increase in the volume and quality of manufactured products with the maximum use of biological, genetic characteristics of this type of product.

Camel milk contains more than a hundred valuable substances. This composition contains the most necessary proteins, fats, carbohydrates, mineral salts and vitamins for the human body. These substances interact well with each other, so they are quickly and completely absorbed. Hippocrates determined that different types of animal milk have different healing properties, according to him, goat and mare's milk cures mammary gland diseases, cow's milk is a cure for anemia, mare's and camel's milk has the ability to cure many diseases.

Camel milk and products from it are an excellent remedy for tuberculosis, diseases of the lungs, blood, stomach and intestines, diabetes and other diseases.

In terms of chemical composition, very and moderately fatty camel meat and its caloric content are not inferior to beef. It contains 17-22 percent more protein and 12 percent more nutritious fat. Camel meat is quickly digested in the human body, like poultry meat.

One of the types of camel products is wool, which, according to its technological properties, is a high-quality and valuable raw material for the textile industry. According to composition, they are divided into downy, long-fiber and woolen. Shawls and sweaters woven from camel wool are lightweight and do not let in the cold. A camel wool vest and trousers are essential clothing for a shepherd.

Our ancestors made a wide belt out of wool and tied it around the backs of people suffering from back pain. From folk medicine, we know that if you soak camel wool in hot water and apply it to a sore spot, the wound will quickly dissolve.

Fabrics woven from long-fiber camel wool were often used to make blankets. Oil-containing wipes and belts for drilling machines are manufactured in industrial conditions. And the fact that astronauts' clothing is made of camel wool is still unknown to many. It is worth noting that there are few places where camel wool is not used in production.

An integrated approach in this project not only provides a comprehensive solution to many global environmental problems, but also brings many benefits in terms of the social and economic aspects of the project activities. Finally, this approach ensures the beginning of actions against desertification and further sustainable development of the project. For the implementation of this project, the introduction of financial and technical means is recommended to the International Environmental Fund and the Institute of Zoology of the Ministry of Health of the Republic of Kazakhstan.

#### 4. Discussion

The findings of this study highlight the crucial role of Kazakh camels in maintaining the ecological balance of the Aral Sea region while providing economic stability for local communities. The results confirm that camel breeding, particularly the Kazakh Bactrian species, is not only an economic asset but also a vital component of environmental conservation efforts. The study demonstrates that the reduction in camel populations poses severe threats to biodiversity, genetic resources, and the socio-economic well-being of rural populations. These findings align with previous research emphasizing the interconnection between traditional livestock farming and sustainable ecosystem management.

One of the key implications of this research is the need for integrated conservation strategies that simultaneously promote camel breeding and environmental sustainability. The study suggests that controlled breeding programs, financial incentives, and community engagement in conservation efforts can significantly improve the long-term viability of the Kazakh Bactrian camel population. This approach is particularly relevant given the increasing desertification and climatic challenges in the Aral Sea region, which threaten both pasture availability and agricultural productivity.

Moreover, the study emphasizes the economic potential of camel-based industries, such as dairy, wool, and meat production. Camel milk, known for its nutritional and medicinal properties, has the potential to enhance food security while supporting rural economies. Similarly, camel wool and meat are valuable resources that, if properly developed and marketed, could increase income opportunities for local farmers. However, the declining interest in camel breeding due to socio-economic constraints, lack of government support, and limited access to resources presents a significant challenge.

The research findings also indicate that conservation initiatives should be supported by government policies, financial investments, and scientific research to enhance camel breeding practices. Establishing demonstration farms and promoting sustainable pasture management could serve as effective models for preserving camel populations while mitigating the effects of desertification. Additionally, partnerships with international environmental organizations could provide funding and technical expertise for long-term conservation efforts.

Despite its contributions, this study acknowledges certain limitations. The data primarily focus on the economic and ecological aspects of camel breeding, while further research is needed to explore genetic diversity, disease resistance, and long-term sustainability models. Additionally, future studies should investigate the socio-cultural dynamics influencing the preservation of traditional camel farming practices.

In conclusion, the study underscores the urgency of implementing conservation strategies that integrate economic incentives with environmental stewardship. By fostering collaboration among farmers, policymakers, and researchers, it is possible to

create a sustainable framework for preserving Kazakh camels and restoring the fragile ecosystem of the Aral Sea region.

### 5. Conclusion

The study showed that conservation and development of camel breeding in the Aral region of Kazakhstan plays a critical role in restoring local ecosystems and maintaining biodiversity. Kazakh camels are not only adapted to harsh climatic conditions, but are also an important source of economic stability for the local population due to the high quality of their milk, meat and wool. The proposed measures to establish demonstration farms and support local farms emphasized the need to integrate environmental and economic aspects into the management of the region's natural resources. To deepen the understanding of the mechanism of interaction between camel breeding and ecosystem restoration, further research is recommended to develop sustainable models of pasture use and assess their impact on the socio-economic parameters of the community.

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