

## Review

# Kharai camel: The endangered swimming camel of Gujarat's saline desert - ecological adaptations, cultural significance, and growing importance in the dairy industry

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## ABSTRACT

The Kharai camel, indigenous to Gujarat, derives its name from the local term "Khara," meaning saline, reflecting its adaptability to both desert and coastal ecosystems. Known as the "Swimming Camel," it can traverse long distances across water and has been preserved by the Rabari and Fakirani Jat tribes for over 400 years. Currently, about 6,200 Kharai camels exist, primarily in Kutch, where they play a crucial role in local ecosystems, particularly in maintaining mangrove forests. However, industrial activities and climate change threaten their habitat and survival, prompting conservation efforts by organizations like Sahjeevan. Recent genetic studies have recognized the Kharai camel as a distinct breed, highlighting its unique traits. The camel's milk, rich in nutrients and with potential therapeutic benefits, is gaining popularity in health markets. Protecting the Kharai camel is essential not only for biodiversity but also for sustaining the livelihoods and cultural heritage of the communities that depend on it.

**Key words:** Conservation, Gujarat, Kharai camel, Mangrove forests

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## INTRODUCTION

The Kharai camel, a remarkable breed indigenous to the region derives its name from the local term "Khara," meaning saline. This nomenclature reflects the camel's exceptional adaptability to both desert and coastal ecosystems. Distinguished by its resilience, the Kharai camel has evolved to thrive in the harsh saline desert environment. This unique adaptation has earned it the title "Swimming Camel," a reflection to its extraordinary capability to traverse long distances across water. Historically, the Kharai camel has been conserved by the Rabari and Fakirani Jat tribes of Gujarat who have maintained its genetic purity for over 400 years. These communities rely on the camels for milk and transportation although modern transport methods have diminished their economic value. The camels are also significant for their contribution to local ecosystems, especially in maintaining the health of mangrove forests (30 Stades, Mongabay-India, 2019).

### Ecological adaptations and distribution

Gujarat is currently the exclusive and sole habitat for the Kharai camels which have uniquely adapted to the harsh conditions of the Rann of Kutch and the highly saline coastal waters of the region's shallow seas. Kutch mangroves are predominantly distributed in three coastal stretches: Jakhau-Kori, Mundra, and Kandla-Surajbari. According to the most recent census, Gujarat is home to approximately 6,200 Kharai camels. Of these, around 2,200 are predominantly located in the Kutch areas, including Lakhpat, Abdasa, Mundra, and

Bhachau, while the remaining population is primarily found in South Gujarat, particularly near Aliya Bet. This distribution highlights the species' remarkable ability to thrive in environments with extreme climates and high salinity. The Kharai camel's ability to thrive in these environments is not just a testament to its resilience but also crucial for the survival of the mangrove forests. These forests are vital for protecting the coastline from erosion and supporting biodiversity. The traditional knowledge and practices of the camel pastoralists, who rely on these camels for their livelihood, are equally important in conserving these ecosystems. Organizations like Sahjeevan have been working with these pastoral communities to support their traditional practices which in turn helps in the conservation of the mangrove forests. These efforts are part of a broader initiative to maintain the cultural and ecological heritage of the region while ensuring the sustainability of both the pastoralist way of life and the environment (Sahjeevan, 2021).

### Threats and conservation efforts

The mangrove habitats that these camels depend on have been under threat from industrial activities, particularly the expansion of salt pans and ports. The destruction of these mangroves not only threatens the survival of the Kharai camel but also impacts the entire coastal ecosystem which supports a wide range of marine life. Conservation efforts including legal action by the National Green Tribunal (NGT), aim to protect these critical habitats to ensure the survival of

both the mangroves and the Kharai camel (Mongabay-India). The Kharai camel faces several threats, primarily due to habitat loss caused by industrial activities such as salt mining and mangrove deforestation. These activities are shrinking the natural grazing areas for the Kharai camel leading to a decline in their population. Additionally, climate change poses a significant threat as rising sea levels and changing weather patterns further endanger their delicate ecosystem.

According to the Livestock Censuses of 2003 and 2007, the camel population in Kachchh district declined from 10,477 to 8,575, a decrease of approximately 20%. As the population fell below 10,000, the Government designated the camel as an endangered domestic breed (Shastri, 2015). A survey conducted by KUUMS (Kachchh Unth Uchherak Maldhari Sangathan) documented that 104 camel-breeding families, primarily from the Jat and Rabari communities, are currently rearing over 4,000 Kharai camels across 21 villages in 11 talukas of the state, while maintaining their traditional feeding practices. The camel-breeding families in Kachchh have successfully organized themselves under KUUMS. With the support of Sahjeevan, a local civil society organization, they have achieved official recognition for their camel as a distinct breed from the National Bureau of Animal Genetic Resources (NBAGR), which subsequently allocated significant funds and efforts to conserve this unique breed. Additionally, they were able to persuade the renowned Amul brand to develop technology for marketing camel milk as a therapeutic drink in the country.

### Scientific and genetic studies

Recent scientific studies have shown that the Kharai camel possesses unique genetic traits that allow it to survive in both saline and arid environments. These studies aim to understand better the adaptive mechanisms of the Kharai camel, which could have implications for breeding programs aimed at enhancing the resilience of other livestock breeds to climate change. In 2015, the Indian Council of Agricultural Research (ICAR) recognized the Kharai camel as a distinct breed, acknowledging its unique characteristics and adaptability, which differentiate it from other camel breeds particularly the Kutchi camel. The Kharai camel's remarkable ability to thrive in both desert and coastal environments of Gujarat, demonstrated by its capacity to swim across salty waters to access mangroves, a key part of its diet highlights its resilience to high salinity levels and harsh climatic conditions. These distinct physical and behavioral traits warranted its recognition as a separate breed by ICAR. Further emphasizing its importance, the National Bureau of Animal Genetic

Resources (NBAGR) in Karnal, Haryana, officially certified the Kharai camel as India's ninth camel breed. This certification underscores the significance of preserving the Kharai camel's genetic diversity and its vital ecological significance.

Study conducted by Patel *et al.*, 2015 provided mainly the molecular characterization of camel breeds in Gujarat using microsatellite markers which revealed significant genetic diversity among the breeds. The results identified distinct genetic groups within the camel populations of Kachchhi and Kharai breed highlighting the evolutionary relationships between two breeds. Similar studies were conducted by Sharma *et al.*, 2020 which mainly determined the significant genetic diversity among three different population of camels i.e., Kharai, Sindhi and Marwari which mainly led to identification of new germplasm from one of the camel populations (Sindhi). These findings mainly emphasized the importance of preserving genetic diversity for effective conservation and breeding strategies

### Importance and health benefits of Kharai camel milk

Kharai camel milk is not only rich in nutrients but also has therapeutic properties (Narnaware *et al.*, 2021). It is being researched for its potential to treat a variety of health conditions, including diabetes, allergies, and autism. The milk contains antibodies that are similar to those found in human milk, making it easier to digest and beneficial for boosting the immune system. The Maldhari community is a traditional pastoralist group primarily found in the Kutch region of Gujarat, India. They have made these Kharai camels a crucial part of their livelihood. These nomadic pastoralists have relied on the Kharai camel for its milk, meat, and as a mode of transportation. The milk of the Kharai camel is highly valued for its nutritional benefits, including being rich in iron, vitamin C, and having insulin-like properties which makes it beneficial for people with diabetes. The economic value of Kharai camel milk is increasing as awareness of its health benefits spreads particularly in urban areas. Kharai camels are gaining recognition in the dairy industry, especially for the high nutritional value of their milk. Camel milk is known for its richness in vitamins, minerals, and immunoglobulins, making it beneficial for health, particularly for people with lactose intolerance or dairy allergies. Kharai camel milk with its distinct properties, is used to produce a variety of dairy products such as butter, cheese, and even cosmetics. Its growing importance is also linked to the rising demand for camel milk in health-conscious markets, both domestically and internationally.

### Emerging market for camel milk products

The demand for camel milk products, including those derived from Kharai camels, is rising globally. In addition to traditional products like milk and butter, new products such as camel milk chocolate, cheese, and even beauty products are being developed. These products are gaining popularity not just in India but also in international markets where consumers are increasingly seeking natural and health-promoting food options.

### Products prepared from Kharai camel milk

Several products are derived from Kharai camel milk contributing to the economy of the Kutch region. These include:

- Camel milk powder: Processed for longer shelf life and ease of transport.
- Camel cheese: Known for its unique taste and nutritional profile, camel cheese is gaining popularity in gourmet markets.
- Camel butter and ghee: Valued for their medicinal properties and rich flavor.
- Cosmetics: Due to the hydrating and nourishing properties of camel milk, it is increasingly used in skincare products.

### CONCLUSION

The Kharai camel is an extraordinary example of biodiversity and ecological adaptation. Its unique characteristics make it invaluable to the environment and the people who rely on it. However, the threats it faces require urgent conservation efforts. Protecting the Kharai camel is not just about preserving a species

but also about sustaining the cultural heritage and economic livelihoods of the communities that depend on it.

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