

From Beast of Burden to Dairy Animal: Transforming Donkey Husbandry for Human Nutrition and Health

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Since time immemorial, donkeys have played an important role in human civilization as dependable “beasts of burden” for transporting goods and people, as well as supporting agricultural and rural activities. Their ability to traverse difficult terrain and carry heavy loads makes them a valuable source of draught power in areas with limited access to roads. In India, donkeys are used in brick kilns as pack animals, at construction sites for transporting materials, and at pilgrimage sites to carry goods uphill. Furthermore, their resilience to harsh climates and low maintenance costs make them ideal for communities with limited resources, especially in arid and semiarid regions. Moreover, donkeys are docile animals that can be easily managed by women and children. Owing to these characteristics, donkeys are often seen as marginalized animals, raised by marginalized communities in marginalized environments.

Over time, the development of roads and mechanization of agriculture have significantly reduced the utility of donkeys as draught animals. This is evidenced by the significant decline in the donkey population in the country (Figure 1). This declining trend is not confined to any specific region but is widespread (Table 1). This raises an important question: how can donkey husbandry be revived? A peek into history indicates solutions for reviving donkey husbandry. Historically, donkey milk has played a significant role in maintaining the beauty of one of history’s most renowned queens, Cleopatra of Egypt, who used it for bathing. Contemporary scientific research has uncovered numerous nutritional and therapeutic qualities of donkey milk, endorsing this ancient observation.

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Figure 1. Trend in donkey population in India



Source: 20th Livestock census 2019, Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, GOI

The opportunity to reverse the decline in the donkey population lies in the commercial exploitation of the unique properties of donkey milk in the cosmetics, nutraceutical, and pharmaceutical industries.

Table 1. Donkey population across major states in India

States	Population (in lakhs) 2012	Population (in lakhs) 2019	% Change
Rajasthan	0.81	0.23	-71.31
Maharashtra	0.29	0.18	-39.69
Uttar Pradesh	0.57	0.16	-71.72
Gujarat	0.39	0.11	-70.94
Bihar	0.21	0.11	-47.94
Jammu & Kashmir	0.17	0.10	-44.55
Karnataka	0.16	0.09	-46.11
Madhya Pradesh	0.15	0.08	-45.46
Himachal Pradesh	0.07	0.05	-34.73
Andhra Pradesh	0.13	0.05	-65.16

Source: 20th Livestock census 2019, Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, GOI

Donkey milk for human nutrition and health

Historically, donkeys have been valued for their draught power, while their potential as dairy animals have remained untapped due to their relatively low

milk yield. Nonetheless, the unique nutraceutical and therapeutic properties of donkey milk distinguish it from the milk of other dairy animals. The unique composition of donkey milk, with lower levels of fat and minerals and higher lactose content, imparts a delightful sweetness and enhances its digestibility. This naturally defatted milk is particularly suitable for children and infants, especially those who are unable to consume their mothers' milk.¹ The digestive benefits of donkey milk are enhanced by its smaller fat globules, which offer a larger surface area for enzymatic activity.² This characteristic, coupled with the substantially lower quantity of fat globules compared with cow, goat, or sheep milk, facilitates its digestion and absorption in humans. Research indicates that donkey milk possesses anti-inflammatory and immune-enhancing properties due to its significant content of bioactive compounds, such as lactoferrin and lysozyme. Furthermore, studies have demonstrated that topical application of donkey milk may alleviate skin conditions, including eczema. Its low-fat content and easily digestible proteins may also benefit individuals with certain gastrointestinal disorders. Donkey milk contains high levels of vitamins A, B1, B2, B6, D, and E, as well as essential fatty acids, which contribute to its moisturizing and nourishing effects. Additionally, donkey milk is rich in lysozyme and lactoferrin³, which possess antimicrobial properties that help protect the skin from harmful bacteria. Its low fat and cholesterol content, coupled with its high energy value, makes it an excellent ingredient for skin care products.

Donkey milk value chain: an emerging niche agribusiness

The rising interest in donkey milk is attributed to its superior nutritional, functional, and nutraceutical properties. It has been used to produce diverse dairy and value-added products, including cheese, ice cream, milk powder, and fermented preparations.

A Delhi-based enterprise, procures donkey milk from Gujarat at approximately ₹200 per litre, with an annual income potential of approximately ₹25,000 per donkey. The company markets freeze-dried donkey milk powder

through online platforms, targeting both domestic and international consumers.

A study of the donkey milk value chain in Rajkot, Gujarat (Table 2), based on a primary survey, highlights significant logistical challenges in milk collection. The main difficulty arises from the migratory nature of pastoralists, who frequently relocate in search of forage resources. Consequently, milk collection agencies must maintain regular communication and track herd movements to ensure continuous procurement.

Milk collection begins early in the morning. Following primary processing, the milk is immediately frozen to retain its quality and transported to the processing unit located near Ahmedabad. At this facility, milk undergoes freeze-drying to produce high-quality donkey milk powder primarily intended for medicinal use. The final product is packaged in 100-gram units and distributed via online platforms.

Analysis of the value chain indicates that producers receive only 18.5% of the consumer's rupee. This limited share results from the high costs associated with milk collection, transportation, processing, packaging, and marketing, in addition to the transformation of raw milk into a high-value processed commodity.

Despite constraints such as low milk yield and high perishability, prospects for enhancing profitability lie in value addition to the milk. The development of niche products, such as creams, gels, and health supplements, can augment income generation. Agribusiness firms such as Dolphin IBA and Kshirsagar Donkey Farm have already initiated the use of freeze-dried donkey milk to manufacture premium skincare formulations.

Opportunities for expansion of donkey husbandry

Over the past decade, the nutraceutical, pharmaceutical, and cosmetic industries in India have witnessed significant growth. The market for nutraceutical products, encompassing dietary supplements, functional foods, and beverages, was valued at US\$ 30.37 billion in 2024 and is anticipated to expand at an annual growth rate of 13.6 percent by 2030.⁴ Similarly, the pharmaceutical industry has witnessed significant growth from US\$ 23.56 billion in 2008-09 to US\$ 58.28 billion in 2022-23.⁵ The market size of India's pharmaceutical industry is projected to reach

¹ Bhardwaj, A., Pal, Y., Legha, R. A., Sharma, P., Nayan, V., Kumar, S., Tripathi, H., & Tripathi, B. N. (2020). Donkey milk composition and its therapeutic applications. *The Indian Journal of Animal Sciences*, 90(6): 837–841.

² Raynal-Ljutovac, K., Lagriffoul, G., Paccard, P., Guillet, I., & Chilliard, Y. (2008). Composition of goat and sheep milk products: An update. *Small Ruminant Research*, 79(1): 57–72.

³ Guo, H. Y., Pang, K., Zhang, X. Y., Zhao, L., Chen, S. W., Dong, M. L., & Ren, F. Z. (2007). Composition, physicochemical properties, nitrogen fraction distribution and amino acid profile of donkey milk. *Journal of Dairy Science*, 90(4): 1635–1643.

⁴ Grandview Research (2024). *India Nutraceuticals Market Size, Share & Trends Analysis Report (2025 – 2030)*. Retrieved from <https://www.grandviewresearch.com/industry-analysis/india-nutraceuticals-market-report>.

⁵ MOSPI (2025). *Annual Survey of Industries*. Retrieved from <https://www.mospi.gov.in/annual-survey-industries>.

US\$ 130 billion by 2030 and US\$ 450 billion by 2047.⁶ The cosmetic industry in India, which includes skincare, haircare, color cosmetics, fragrances, and personal hygiene products, was valued at approximately US\$ 8.12 billion in 2023. It is anticipated to expand to US\$ 10.98 billion by 2032.⁷

In response to the increasing demand for donkey milk and its derivatives, several ventures have emerged in the field of donkey farming. Noteworthy examples include Dolphin IBA Donkey Farm in Kochi (Kerala), Kshirsagar Donkey Farm (Karnataka), Sri Farms in Baptla (Andhra Pradesh), Nandhini Donkey Farm in Nalgonda (Telangana), Nagpur Jenny Farm in Nagpur (Maharashtra), Akshaya Donkey Farm in East Godavari (Andhra Pradesh) and Sri Karthikeya Donkey Farm in Tuni (Andhra Pradesh). Additionally, some processors have entered the market.

Table 2. Value chain for donkey milk at Rajkot (Gujarat)

Particulars	Rupees
Cost of donkey milk (@ Rs 200 per litre for 7200 litre) paid to pastoralists	1440000
Milk collection, primary processing and transportation charges up to processing plant	451200
Milk processing charges (@ Rs 150 per litre) for converting into powder (1 kg powder from 12 litre milk)	1080000
Transportation, packaging and marketing cost of 600 kg milk powder	693000
Total cost of 600 kg milk powder	3664200
Total cost per kg of milk powder	6107
Sale price/ kg of powder	13000
Net Profit / kg of powder	6893
Annual Returns from donkey milk	7800000
Annual Net Returns from donkey milk	4135800
B:C Ratio	2.13
Farmer share in consumer rupee (Percent)	18.46

Policy suggestions

To unlock the transformative potential of donkey milk in enhancing human nutrition and health, it is crucial to address the following pressing issues.

Verify and recognize scientific claims: The increasing interest in donkey milk arises from its unique

⁶ India Brand Equity Foundation (IBEF) (2024). *Indian Pharmaceuticals Market*. Retrieved from <https://www.ibef.org/news/india-s-nutraceutical-industry-poised-for-global-growth-with-supportive-initiatives>.

⁷ Zion Market Research (2024). *Cosmetic Products Market Size, Share and Growth Report 2032*. Retrieved from <https://www.zionmarketresearch.com/report/cosmetic-products-market>.

The case of the Halari donkey in Gujarat

Halari is one of India's four officially recognized indigenous donkey breeds and is mainly found in the semi-arid region of Saurashtra, Gujarat. This strong and hardy breed has been traditionally reared by Maldhari pastoralists and potters. These donkeys have been used to carry goods, especially during long seasonal migrations. According to Sahjeevan, an NGO, the population of this breed declined from 1,112 in 2015 to 662 in 2020 and further to just 469 in 2023, indicating that the breed is critically endangered. Sahjeevan took the lead in getting it officially recognized as a breed in 2018.

Successful donkey farm in Karnataka state

The Kshirsagar Donkey Farm (KSD Farm), established in 2024 in the Tumakuru district of Karnataka, exemplifies an emerging model of livestock entrepreneurship and sustainable resource utilization. The farm specializes in the production and promotion of high-quality donkey milk and a range of value-added products. Its distinctive handmade cosmetic line includes donkey-milk soaps, night creams, and other skincare formulations crafted from natural ingredients. Fresh donkey milk is sold directly at the farm and supplied directly to consumers in Bengaluru city. Beyond milk and cosmetics, KSD Farm has diversified its portfolio to include donkey manure enriched with microbial consortia, donkey-urine-based biofertilizers, and the innovative "Gadhamrutha-01" organic liquid manure. In addition to product development, the farm functions as a knowledge hub by providing scientific training in donkey farming. For marketing and outreach, KSD Farm actively leverages social media platforms, reinforcing its forward-looking vision: "Donkey: The Future Goldmine."

composition and potential health benefits, as claimed by the scientific community. However, the absence of regulatory provisions to verify these claims presents a significant challenge for both processors and consumers. This regulatory gap not only creates market uncertainty but also impedes the development of standardized products and therapies. Collaboration between the Indian Council of Medical Research (ICMR) and the Indian Council of Agricultural Research (ICAR) could address this issue. By establishing a robust scientific foundation and regulatory framework, this initiative has the potential to fully harness the benefits of donkey milk across various industries, thereby fostering the development of innovative products

that contribute to human nutrition and improve public health.

Breeding for higher milk yield: India's potential annual production of donkey milk is estimated to be 1,353 thousand liters. The country has four recognized donkey breeds: Spiti, Halari, Ladakhi, and Kachchhi, each with varying milk yields ranging from 0.5 to 2 litre per day, with Halari having the highest milk yield. Crossbreeding with superior germplasm is advisable to enhance milk production. This genetic improvement should be complemented by advances in animal nutrition and health.

Incentives for commercial donkey farming: Given the low level of milk production and the limited number of donkey owners with small herds, it is crucial to promote organized donkey farming through start-ups. Offering capital subsidies and concessional financing to entrepreneurs interested in establishing donkey farms can help offset the initial setup costs. Additionally, skill development programs and training in proper animal husbandry techniques, nutrition management, disease prevention, and breeding practices are vital for ensuring the success of donkey farming.

Recognizing donkey milk and its derivative food products for FSSAI Licensing: Currently, the market for donkey milk faces several challenges due to limited awareness, lack of regulatory recognition, and inadequate marketing infrastructure. Comprehensive research and structured training programs are essential to ensure the scientific production, processing, and value addition of donkey milk and its by-products. Promoting donkey farming through proper market linkages, ensuring FSSAI-Food Safety and Standards Authority)recognition, and formulating clear standards for donkey milk and its derivatives will not only help conserve this underutilized livestock species but also create new avenues for rural entrepreneurship and sustainable income generation.

Establish market linkages: Establishing market linkages with nutraceutical, pharmaceutical, and cosmetics industries and creating Donkey Milk Processing and

Value Chain Centers for hygienic processing, quality assurance, and value-added product development is crucial for sustainable donkey farming. These industries can leverage the unique properties of donkey milk to develop innovative products, potentially increasing the demand and market value. By fostering partnerships with farmers and these industries, farmers can have a steady market for donkey milk, and industries can gain access to high-quality milk for their specialized products.

Create awareness of the properties of donkey milk: Historically, donkey farming in India has been undervalued because of its association with socially marginalized communities, even though donkey milk has been acclaimed for its exceptional nutritional and therapeutic properties. In contrast, Western countries appreciate donkey milk for these qualities, leading to its popularity in high-end markets. Globally, the market is estimated at approximately US\$ 24.79 million and is expected to experience substantial growth. Major exporters include Mexico, Turkey, and France, with countries such as Costa Rica, El Salvador, and Vietnam among the primary importers.⁸ Raising awareness of the nutritional and therapeutic properties of donkey milk through advertisements and campaigns can significantly transform the livelihoods of those involved in dairy farming.

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⁸ SEAIR Exim Solutions (2025). *Donkey milk export from India: Growing market and trends*. Retrieved from <https://www.seair.co.in/blog/donkey-milk-export-from-india.aspx>.

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