



Bio Vet Innovator Magazine

(Fueling The Future of Science...)

Volume 3 (Issue 7) JULY 2026



World Zoonosis Day – 06th July 2026

Popular Article

Dangi Cattle: A Hardy Dual-Purpose Breed of the Western Ghats

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DOI: <https://doi.org/10.5281/zenodo.21458462>

Received: July 17, 2026

Published: July 19, 2026

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Abstract:

Dangi is a registered indigenous cattle breed of Maharashtra and adjoining Gujarat, shaped by the heavy rainfall, steep slopes and rice fields of the Western Ghats. It is often introduced only as a draught breed, but that description misses an important part of its value. ICAR-NBAGR records its utility as “Work-Draught; Food-Milk”, and published classifications and field studies support the same dual-purpose identity. Dangi bullocks are prized for hard hooves, sturdy limbs and dependable work in wet and rugged terrain, while cows provide household milk with about 4.3% fat. Field records have reported an average lactation yield of about 511 kg and a lactation length of nearly 302 days. The breed also supports smallholder and pastoral livelihoods through grazing, seasonal migration, manure and breeding-animal sales. This article brings together production, morphology, management, genetic and conservation evidence to present Dangi as a predominantly draught-oriented, but genuinely dual-purpose, climate-resilient cattle breed.

Keywords: Dangi cattle, dual-purpose breed, Maharashtra, indigenous cattle, Western Ghats, milk production, draught power, climate resilience, conservation

India's Dairy Leadership and The Place of Dangi:

India remained the world's largest milk-producing country in 2024–25, producing 247.87 million tons of milk and providing 485 g of milk per person per day. Indigenous cattle contributed 11.20% of the national milk pool, showing that native breeds continue to support food production alongside their roles in adaptation, farm work and rural livelihoods (DAHD, 2025).

This production base is supported by exceptional animal genetic diversity. ICAR-NBAGR lists 246 registered livestock and poultry breeds in India—242 indigenous and four synthetics. Of the 58 registered cattle breeds, 55 are indigenous and three are synthetic. Dangi is one of these indigenous cattle breeds and is registered as INDIA_CATTLE_1104_DANGI_03004 (ICAR-NBAGR, 2026a, 2026b).

The breed is especially relevant to Maharashtra, which ranked fifth in national milk production in 2024–25. The state contributed 6.71% of India's milk, approximately 16.63 million tonnes, while per capita availability reached 358 g/day (DAHD, 2025). These are state-level figures rather than Dangi-specific estimates, but they underline the value of a locally adapted breed that can provide both milk and farm power in Maharashtra's hilly and high-rainfall regions.

A Breed Shaped by The Western Ghats:

The main Dangi tract includes Akole in Ahilyanagar district, Sinnar and Igatpuri in Nashik, adjoining parts of Thane and Palghar, and the Dangs district of Gujarat. The name is linked either with the Dangs region or with the Marathi word dang, meaning mountain. Kandadi is the official synonym, while Kanada, Konkani and Ghauti also occur in breed literature (ICAR-NBAGR, 2026b; Janmeda et al., 2013).

The landscape explains much of the breed's character. Heavy monsoon rain, broken hills, forest margins, wet paddy fields and seasonal fodder scarcity favour cattle that can walk, graze and work under difficult conditions. Dangi animals are medium-sized and compact, usually white with irregular black or red patches. They have a slightly prominent forehead, short thick horns and strong dark hooves. An oily skin secretion is widely described as helping the animals withstand prolonged rainfall (ICAR-NBAGR, 2026b; Janmeda et al., 2013).

Field studies also show a solid working frame. Mature Dangi males averaged about 351 kg, with a chest girth of 166 cm, body length of 126 cm and height at withers of 125 cm (Shinde et al., 2020b). Colour-based field types such as Bahala, Manhera, Kala, Khaira, Shevra and Para are recognized by farmers; the black-and-white Bahala type is particularly popular in the Akole tract (Kauthale et al., 2019).

Why Dangi Is a Dual-Purpose Breed?

Dangi cattle are best known for draught work, but describing them only as draught animals is incomplete. The official ICAR-NBAGR descriptor records both "Work-Draught" and "Food-Milk". Singh (2006) placed Dangi in the dual-purpose group of Indian cattle, and Janmeda et al. (2013) likewise described the breed as useful for milk as well as ploughing, rice-field operations and timber carting.

The two functions are also visible in field data. In a survey of 335 Dangi owners, 81.79% reared the breed mainly for agricultural operations. At the same time, milk was routinely handled: 96.42% of respondents cleaned the udder before milking and 97.91% cleaned milk utensils (Kauthale et al., 2019). This pattern is typical of a draught-oriented dual-purpose system—work is the dominant output, but milk remains a regular household and economic product.

Dual-purpose does not mean that Dangi cows should be compared with specialized dairy breeds. It means that the same population contributes through cows that produce useful milk and replacement calves, and through males and bullocks that provide reliable power for cultivation and transport. Milk, work, manure, mobility and survival under low-input conditions together define the breed's value.



Fig. 1. Adult Dangi female showing the characteristic white coat with irregular black patches and a compact, field-adapted frame. Photograph by Sumit Karwa, taken during postgraduate research work at the Cattle Breeding Farm and Dangi Cow Research Station, Igatpuri, Nashik, Maharashtra.



Fig. 2. Field herd of Dangi cattle showing variation in the breed-typical black-and-white spotted coat pattern. Photograph by Sumit Karwa, taken during postgraduate research work at the Cattle Breeding Farm and Dangi Cow Research Station, Igatpuri, Nashik, Maharashtra.



Fig. 3. Young Dangi cattle under field conditions, showing sturdy limbs, dark hooves and variable coat markings. Photograph by Sumit Karwa, taken during postgraduate research work at the Cattle Breeding Farm and Dangi Cow Research Station, Igatpuri, Nashik, Maharashtra.



Fig. 4. Dangi breeding bull "PYASA" (date of birth: 10 September 2014; sire: Dandagya; dam: Bali; dam's best lactation yield: 1100 kg; milk fat: 4.0%; INAPH ID: BAF-PYASA). Source: BAIF Sire Directory. Reuse is subject to permission from BAIF.

Milk Production and Reproductive Potential:

The ICAR-NBAGR descriptor reports an average lactation yield of about 430 kg, with a range of 175–800 kg and milk fat around 4.3%. A wider field study of 189 cows across the Maharashtra breeding tract reported 511.07 ± 11.60 kg milk per lactation, a peak yield of 2.65 ± 0.03 kg/day, 37.78 ± 0.26 days to peak yield and a lactation length of 301.70 ± 3.74 days (Shinde et al., 2020a). The variation among locations suggests scope for improvement through better nutrition, recording and selection.

Citation: Sumit Karwa, Sunita Didel, R. K. Deepikarani, Mohit Khatri and Sushil Kumar Sharma. (2026). Dangi Cattle: A Hardy Dual-Purpose Breed of the Western Ghats. In Bio Vet Innovator Magazine (Vol. 3, Issue 7, pp. 72–78). Bio Vet Innovator Magazine. <https://doi.org/10.5281/zenodo.21458462>

Milk-quality data further confirm the breed's food function. In 60 lactating cows from Kotul, Akole and Sangamner, mean milk composition was 4.278% fat, 8.943% solids-not-fat, 3.283% protein and 4.873% lactose (Thorat et al., 2026). The same study found polymorphism in intron-2 of the leptin gene, although the detected genotypes were not significantly associated with the measured milk traits. These results provide a useful baseline for larger genomic and production studies.

Reproductive performance remains an important area for practical improvement. The breed descriptor gives an average age at first parturition of about 53 months and an inter-calving interval of around 19 months. A postpartum nutrition study in Dangi cows indicated that energy, chelated minerals and vitamin supplementation could improve metabolic status and support earlier ovarian activity, highlighting the importance of management alongside genetic selection (Shelar et al., 2024).

The BAIF bull PYASA shows how milk information can be included in a balanced breeding programme. His recorded dam, Bali, had a best lactation yield of 1100 kg with 4.0% fat. Such pedigree-linked records can help identify better milking families, provided selection also protects hoof strength, legs, temperament, endurance and rainfall adaptation (BAIF Sire Directory, 2026).

Work Ability, Grazing and Pastoral Livelihoods:

Dangi bullocks are valued for ploughing, harrowing, carting and work in wet rice fields, where soft soil and continuous rain demand strong hooves and steady movement. Their moderate body size is an advantage on narrow paths and slopes, and their ability to survive largely on grazing keeps costs low for small farmers (ICAR-NBAGR, 2026b; Shinde et al., 2020b).

The breed is closely linked with Kanadi, Mahadeo Koli, Thakar and other custodian communities. In the Ahilyanagar survey, 57.62% of owners kept small herds, 85.98% relied mainly on grazing and 61.79% used natural service (Kauthale et al., 2019). These figures show that Dangi conservation is inseparable from smallholder farming, common grazing resources and access to suitable breeding bulls.

Seasonal movement is part of this production system. Kauthale et al. (2021) documented a traditional migration route of about 208 km and recorded 13 fodder species used along the way. Migration helps herders find feed and water during scarcity, but shrinking grazing land, poor-quality fodder, limited veterinary services and safety concerns increasingly threaten this practice. Mobile animal-health services, water points and protected grazing routes would directly support both the breed and its keepers.

Genetic Value and Conservation Priorities:

Historical breed estimates listed about 108,197 Dangi cattle in 2001 and 119,373 in 2013 (ICAR-NBAGR, 2026b). Updated field enumeration is now needed to identify true-to-type animals, active breeding males and the distribution of local strains. Numbers alone are not enough; a viable breed also requires genetic diversity and a broad base of unrelated breeding animals.

Genome-wide studies of Indian cattle have shown declining effective population sizes in several

breeds and have emphasized the need to avoid overuse of a few popular sires (Strucken et al., 2021). Microsatellite research on lesser-known Indian cattle populations has similarly shown that most variation may be retained within populations, supporting broad sampling across herds and locations rather than narrow selection from a few families (Sharma et al., 2023). For Dangi, molecular information should complement—not replace—field records of milk, fertility, work ability, hoof quality and farmer preference.

A practical conservation programme should combine in situ and ex situ approaches. In situ work must keep viable herds in the native production system by supporting farmers, grazing access and field performance recording. Ex situ conservation should secure semen, embryos, DNA and somatic cells from unrelated, true-to-type animals. The following priorities are especially important:

- Conduct an updated breed-wise survey across Ahilyanagar, Nashik, Thane/Palghar and the Dangs.
- Record milk yield, fertility, longevity, work performance, hoof soundness and adaptability together.
- Use several unrelated elite bulls from different locations and colour types, avoiding excessive use of a single sire.
- Improve access to artificial insemination, pedigree recording, mobile veterinary care, fodder and water along migratory routes.
- Link conservation incentives with farmer groups, breed exhibitions, germplasm banking and recognition of custodian knowledge.

Future Direction:

The goal should not be to turn Dangi into a high-input dairy breed, nor to preserve it only as a reminder of animal-powered farming. A better approach is balanced improvement: more consistent milk yield, improved fertility and longer productive life without weakening the hooves, legs, temperament, muscular capacity and endurance that make the breed useful in its native tract.

Village-level recording can make this possible. A dual-purpose selection index could combine lactation yield, fat and protein, fertility and calf survival with work endurance, body conformation, hoof soundness and farmer preference. Genomic tools can help verify breed composition and manage relatedness, but animals should ultimately be selected on performance under the rainfall, terrain and management conditions for which Dangi evolved.

Conclusion:

Dangi is a hardy indigenous cattle breed of Maharashtra and adjoining Gujarat with a clear dual-purpose identity. Its draught role is dominant and exceptionally well adapted to wet rice fields, heavy rainfall and rugged hills, while its cows provide useful milk with good fat content under low-input conditions. Official classification, field production records and farmer practices all support this balanced milk-and-work description.

The breed's future depends on improving both functions without sacrificing adaptation. Wider

performance recording, better nutrition and reproductive care, use of unrelated superior bulls, support for migratory herders and secure germplasm conservation can keep Dangi productive and genetically diverse. Conserving the breed is therefore not only about protecting a cattle population; it is about retaining renewable farm power, local milk, rural knowledge and a climate-resilient production system of the Western Ghats.

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