

Room to Breathe : Open housing and heat management for healthier, more productive animals

Dr. Naina Singh, Veterinary Officer, Government of Maharashtra

Dr. Vishal Awate, Veterinary Officer, Government of Maharashtra

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Key Points

- **Open housing helps reduce heat stress:** Well-designed, naturally ventilated sheds with high insulated roofs, wide eaves, shade trees and dry floors improve livestock comfort and welfare in hot climates.
- **Cooling and feeding management protect productivity:** Fans, skin-wetting sprinklers, adequate drinking water, cooler feeding schedules and careful handling can help maintain milk production, fertility and animal health during summer.
- **Affordable technology can improve heat management:** Temperature and humidity sensors can trigger fans and sprinklers automatically, while improvements introduced in stages can help farmers manage costs and reduce heat-related production losses.

Abstract

Heat stress is a major challenge for livestock production in India, particularly during the hot summer months when high temperatures and humidity impair animal comfort, feed intake, milk production and reproductive performance. Open or loose housing systems offer a practical approach to managing heat by allowing free animal movement, promoting natural ventilation and providing shaded resting and feeding areas. Important design features include east–west shed orientation, high and insulated roofs, open sides, ridge ventilation, wide eaves, shade trees and effective drainage. During periods of intense heat, direct cooling through fans, skin-wetting sprinklers and access to clean drinking water can further reduce the thermal load. Adjusting feeding times, maintaining nutrient-dense diets, avoiding midday handling and monitoring early signs of heat stress are also essential management practices. Low-cost temperature and humidity sensors can support automated cooling and improve timely intervention. Similar principles, adapted to species-specific requirements, can benefit goats, sheep, poultry and young stock. The adoption of affordable housing improvements and appropriate cooling strategies can help safeguard livestock welfare, sustain productivity and strengthen the resilience of Indian dairy farming under increasingly challenging climatic conditions.

Keywords: Open housing system; Heat stress; Dairy cattle; Buffaloes; Livestock housing; Temperature-humidity index; Evaporative cooling; Milk production; Reproductive performance; Climate-resilient livestock farming

Walk past a dairy farm on a May afternoon in Vidarbha or Marathwada and you will see the problem at once. Cows crowd under any shade they can find, breathe fast with open mouths, and stand rather than eat. The thermometer says 42 degrees, but the animal is suffering from something worse than the heat alone. It is the combination of heat, humidity and a shed that traps both.

India produced about 239 million tonnes of milk in 2023-24 and is the world's largest producer, with cattle and buffaloes contributing the bulk of it (DAHD, 2024). Protecting these animals from heat is therefore a matter of national as well as household income.

How we house animals decides much of how well they cope. For most of India, the answer lies in open housing, and in managing heat with a few simple, affordable steps.

What is an open housing system?

In open housing, also called loose housing, animals are not tied in a stall all day. They move freely between a shaded resting area, a feeding area and an open paddock. Sheds have wide open sides, a raised roof and no solid walls, so air moves through naturally. The tie-stall barn, with its low roof and closed sides, belongs to cold climates, not to ours.

Open housing suits the Indian climate because it works with the weather instead of against it. Fresh air removes heat, moisture and ammonia. Sunlight and dry floors keep germs down. Animals choose where to stand, lie or drink, and that freedom is itself a mark of good welfare.

Why heat is a hidden thief

Cattle and buffaloes make a great deal of heat inside their bodies, especially high-yielding animals digesting large amounts of feed. They lose this heat poorly, because they sweat less than humans and, in the case of buffaloes, have dark skin and few sweat glands. When the air is hot and humid, the body cannot shed heat quickly enough, and the animal is said to be heat stressed.

The effects are widely documented. Heat-stressed cows eat less, produce less milk, show weaker signs of heat, conceive less often and become more prone to disease (West, 2003). In India, a review of cattle and buffaloes found that conception rates fall once THI crosses about 72 in cattle and about 75 in buffaloes, and recommended nutritional changes, better housing and timed insemination in the hot months of May and June (Dash et al., 2016). The loss is often silent. The farmer sees a small drop in yield or a repeat breeder, not the heat that caused it.

Scientists measure the load with the Temperature-Humidity Index (THI), which combines air temperature and relative humidity. For high-yielding dairy cattle, stress generally begins when THI rises above about 72, and it worsens as the number climbs. Indigenous breeds and zebu crosses tolerate more heat than Holstein Friesian crosses, but none is immune. Indian studies on Murrah buffaloes at Karnal, for example, show that milk yield and fertility respond to THI and that July and August are critical months (Behera et al., 2018).

Designing a cooler shed

- **Orientation.** Build the long axis east to west so the sun does not shine into the shed for most of the day, while the open sides catch the prevailing breeze.
- **A high, insulated roof.** A tall roof lets hot air rise and escape. Thatch, tiles or a double layer with an air gap are cooler than bare metal sheets. Painting a metal roof white on the outside, or adding a layer of straw or paddy husk underneath, can lower the temperature below it noticeably.
- **Wide eaves.** Overhanging eaves keep the low morning and evening sun and the rain off the animals and the feed.
- **Open sides and a ridge opening.** Air should enter through the sides and leave through the top, creating a natural chimney effect.
- **Shade trees.** Neem, tamarind and other broad-canopy trees on the west and south sides cool the surroundings at almost no running cost.
- **Dry, clean floors.** Good drainage and a gentle slope keep the resting area dry, which helps both comfort and hoof and udder health.

Cooling the animal directly

Good design lowers the heat load, but in peak summer the animal itself must be cooled. The best methods use the fact that evaporating water carries heat away.

- **Fans.** Moving air over the animal helps it lose heat, especially at the feeding and resting areas. Fans work much better when the animal is wet.
- **Sprinklers and foggers.** Wetting the skin and then blowing air over it is the most effective way to cool a cow (Armstrong, 1994). Sprinklers should wet the coat down to the skin in short cycles, with fan-driven drying in between. Fine foggers suit drier regions, but in humid weather they add moisture to the air and help less.
- **Wallows and cool water.** Buffaloes should have access to a wallow or regular showers. Without it, they overheat quickly.
- **Plenty of clean, cool water.** A cow in hot weather may drink very large quantities. Provide wide troughs, keep them shaded and clean, and place them at the exit of the milking area.

Here technology helps. A low-cost temperature and humidity sensor can calculate the THI and switch on fans and sprinklers automatically when a set level is crossed, so cooling no longer depends on someone remembering at noon. This is the point where the smart-farming ideas of the previous article meet everyday shed management.

Feeding and management in hot weather

- **Shift feeding times.** Offer more of the ration in the cooler early morning, late evening and night, when animals eat more willingly.
- **Raise the nutrient density.** Because intake falls, the feed must carry more energy and good-quality protein in less volume. Fresh green fodder, bypass fat and mineral mixtures, especially with sodium, potassium and magnesium, help; consult a veterinarian or nutritionist for the right levels.

- **Handle gently and avoid midday work.** Move, milk, vaccinate or treat animals in the cooler hours.
- **Watch for warning signs.** Rapid breathing, drooling, drooping heads, reduced rumination and animals crowding at the water point mean the herd needs help now.
- **Plan breeding around the season.** Fertility drops in hot months. Extra care with heat detection and, where possible, timing inseminations for cooler periods improve conception.

Other animals, same principles

Goats and sheep do well in raised, slatted-floor open sheds that keep them off damp ground, with shade and water in the paddock. Poultry houses are best built with open sides covered by wire mesh and curtains that can be raised or lowered. Birds are especially sensitive to heat, so extra ventilation, cool drinking water and feeding in the cooler hours matter a great deal. Calves and newborns need shade and dry bedding in summer and protection from cold winds in winter, so side curtains are a useful addition even in an open shed.

Mistakes to avoid

- **Overcrowding.** Too many animals in a shed raise the heat and humidity inside it. Give each animal enough space to lie down and move freely.
- **Leaving metal roofs bare.** An unpainted tin roof can turn a shed into an oven.
- **Using foggers in humid air.** In monsoon-like humidity, misting can make conditions worse. Sprinkling with strong fans is the better choice.
- **Letting water run short.** A broken pipe or an empty trough in the afternoon can undo all other efforts.
- **Ignoring winter.** Open housing still needs a plan for cold nights and rain, with curtains, dry bedding and wind protection for calves and young stock.'). h('Is it worth the cost?

Open housing is among the cheapest options available, since it needs less material than a closed barn. Improvements can be added in stages: begin with shade, water and a white-painted roof; then add fans and sprinklers for the most productive animals; and only later think about sensors and automation. Even small steps pay back through better milk yield, better fertility and fewer treatments. The costs of ignoring heat, in lost milk and failed breeding, recur every summer.

The bottom line

Heat will remain a fact of life for Indian livestock, and climate change will make it fiercer. A well-designed open shed, plenty of water, smart cooling and sensible feeding let our animals stay comfortable and productive even in the hottest months. A cow that is comfortable gives back more than she costs.

Further reading

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