Indian Veterinary Magazine
a monthly Magazine
of the people, by the people, for the people

Vol 2 Issue 10 Oct 2026, 1125-1129 ISSN:3108-1398

When the Cow Talks to the Cloud

How the Internet of Things is quietly transforming animal husbandry

Dr. Naina Singh[1], Dr. Vishal Awate[2]
[1] M.V.Sc. (Veterinary Medicine), Veterinary Officer (Gr–A), Buldhana, Maharashtra, India.
[2] M.V.Sc. (Veterinary Pathology), Veterinary Officer (Gr–A), Buldhana, Maharashtra, India.
***Corresponding Author**: Dr. Vishal B. Awate; Email: awatev469@gmail.com
doi.org/10.5281/IndianVetMagazine.23243949

Key Points

- IoT and Precision Livestock Farming use sensors, connected devices and data analytics to continuously monitor animal health, behaviour, reproduction, nutrition and farm conditions.
- Technologies such as smart collars, RFID tags, milk sensors, environmental monitors, smart feeders and computer vision can support earlier disease detection, heat detection, heat-stress management and better farm decisions.
- IoT can reduce labour and improve productivity, but cost, connectivity, sensor accuracy, technical support, data ownership and animal welfare remain important challenges.

Abstract

The Internet of Things (IoT) is transforming livestock farming by connecting animals, farm equipment and environmental monitoring systems to digital platforms that can collect and analyse information continuously. Sensors can track activity, rumination, body temperature, milk characteristics, feed and water intake, while cameras and computer vision can help identify changes in body condition, movement and behaviour. These technologies support earlier detection of health problems, improved oestrus and calving monitoring, heat-stress management and more efficient use of labour. The approach is particularly relevant to India, where livestock farming supports millions of rural households and farmers increasingly face labour shortages and the need for higher productivity. However, adoption is constrained by equipment costs, poor connectivity, false alerts, limited technical support and concerns over data ownership. Low-cost sensors, edge computing, mobile applications and cooperative models could help make digital livestock technologies more accessible to small and medium farmers.

Keywords: Internet of Things; Precision livestock farming; Smart farming; Livestock monitoring; Dairy farming; Animal health; Oestrus detection; Digital agriculture

Introduction

It is five in the morning on a dairy farm. The farmer is still asleep, but his phone buzzes. A message reads: "Cow No. 214: activity up 70%, possible heat. Best insemination window:

next 12 hours." Elsewhere, a second alert warns that a cow's rumination has dropped sharply overnight. Nobody walked through the shed to notice either problem. A small sensor on each animal did the watching.

This is not science fiction. It is the Internet of Things (IoT) at work in livestock farming, and it is arriving in cattle sheds, poultry houses and goat farms around the world, including India.

Why livestock farming needs a digital helping hand

Livestock is the backbone of rural India. Milk, meat, eggs, wool, manure and draught power sustain millions of families, and India is the world's largest milk producer. Yet the way we look after animals has changed little in decades. It still depends on a farmer's eyes, experience and available time.

That model is under strain. Labour is scarcer and costlier, herds are growing, and the push for higher yield per animal means every cow's nutrition, health and breeding must be watched closely. A sick animal often hides its illness until it is advanced, and by then milk is lost and treatment costs rise. Spotting trouble early is the single biggest advantage that technology can offer.

So what exactly is IoT?

Think of IoT as giving farm objects a nervous system. Sensors collect information, such as body temperature, movement, rumination, shed humidity or water use. A network carries that information to a computer or cloud platform, where software looks for patterns. If something looks abnormal, an alert reaches the farmer or veterinarian. In automated systems, a device called an actuator can act at once by switching on a fan, opening a feeder or starting a sprinkler.

The whole chain can be summed up in one line: sense, communicate, analyse, decide, act. Researchers call the wider approach Precision Livestock Farming, in which animals are managed as individuals and not simply as a herd (Wathes et al., 2008; Berckmans, 2017). IoT provides the plumbing that makes this possible.

The gadgets on the modern farm

- **Smart collars, ear tags and leg bands.** These track steps, lying time, rumination and temperature. A cow in heat walks and mounts more; a cow falling ill eats and ruminates less. The sensor notices what a busy human cannot.
- **RFID identification.** A unique electronic tag lets feeders, milking parlours and weighing scales recognise each animal automatically, so its yield, feed intake, treatments and breeding history build into a digital record. India's national animal-tagging and digital livestock record initiatives follow the same idea.

- **Milk sensors.** Changes in milk quantity, conductivity or temperature can hint at mastitis before the udder looks abnormal.
- **Shed environment sensors.** Temperature and humidity probes calculate heat stress, while gas sensors track ammonia in poultry and pig houses. Linked to fans, foggers and ventilators, they keep animals comfortable without constant supervision.
- **Smart feeders and water monitors.** These deliver the right ration at the right time and flag a sudden fall in drinking, often the first sign that something is wrong.
- **Cameras and computer vision.** Image analysis can score body condition, spot lameness from the way an animal walks, or count and weigh birds without handling them (Yin et al., 2023).

What it means for the animals and the farmer

Earlier detection of disease. Reviews of IoT in livestock report using temperature, activity, heart rate, respiration and milk characteristics for health surveillance (Modak et al., 2025). An alert that a cow is "off" lets the veterinarian examine her a day or two sooner, which can mean milder illness, cheaper treatment and less milk lost.

Better breeding. Missed heat is one of the costliest problems in dairying, because every extra day open means lost milk and income. Activity sensors can detect oestrus around the clock, including at night when it is least likely to be noticed, and can also warn of impending calving.

Comfort in a warming climate. Heat stress cuts feed intake, milk yield and fertility, and Indian summers are getting harsher. Systems that read the temperature-humidity index and switch on cooling automatically protect both welfare and production.

Less drudgery, better decisions. Automated feeding, watering and milking reduce repetitive labour, while digital records replace scribbled notebooks. The most valuable idea is "management by exception": instead of checking every animal, the farmer is directed to the few that need attention today (Rutten et al., 2013).

A day on a smart dairy farm

Picture a 40-cow dairy in a Maharashtra village. At night, the collars log every cow's steps and chewing. At dawn, the farmer's phone shows a short list instead of a long shed walk: two cows probably in heat, one eating less than usual, and a note that the shed humidity will reach a stressful level by noon. The foggers switch on by themselves at ten. In the evening, the milking system records each cow's yield against her tag number. Over a few weeks, the farmer sees which cows pay their way, which need a closer look, and which feed rations are worth their cost. The work is no less skilled than before, but it is better aimed.

Not only for cattle

Although dairy cattle lead the way, IoT is spreading across species. In poultry houses, sensors keep temperature, humidity and ammonia within safe limits and flag drops in feed or water use. Pig farms use similar controls and image-based monitoring. For sheep and goats, GPS collars help track grazing animals across large areas, which matters in dry regions where flocks travel far. Even backyard farmers can benefit from simple tools, such as a mobile app that reminds them of vaccination dates or a low-cost temperature alarm for a kid shed.

The reality check: challenges on the ground

Technology is not a magic wand, and honest discussion must include its limits.

- **Cost.** Sensors, gateways and subscriptions can be expensive for a farmer with five or ten animals.
- **Connectivity.** Rural areas often have weak networks, and a sensor that cannot send data is useless.
- **Accuracy and false alarms.** Hair, dirt, rough handling and weather affect sensors. Too many false alerts and the farmer stops trusting the system.
- **Skills and support.** Someone must install, maintain and interpret these systems. Training and local service are as important as the device.
- **Data security and ownership.** Farm data has value, and farmers should know who stores it and who can use it.
- **Animal welfare.** Devices must be light, comfortable and safe for the animal, and should support, never replace, good stockmanship.

A sensor can say that an animal is behaving differently. It cannot say why. The veterinarian and the farmer's judgement remain irreplaceable.

Where do we go from here?

The future is promising. Edge devices that analyse data on the farm itself will work even when the internet drops. Artificial intelligence is getting better at turning raw readings into reliable predictions (Tangorra et al., 2024). Low-cost sensors, solar-powered devices and mobile apps in local languages can bring these benefits to smallholders, who keep most of India's animals. Cooperative dairies and farmer-producer organisations could share equipment and data services to spread the cost.

For farmers wondering where to begin, the advice is simple. Start with one real problem, such as missed heats, mastitis or summer heat stress. Choose a technology that solves that problem, try it on a small group of animals, train the people who will use it, and measure whether it actually saved money or effort. Technology should serve the farm, not the other way round.

The bottom line

IoT will not replace the farmer's bond with his animals. What it can do is extend his senses, so that no cow suffers unnoticed and no opportunity is missed. As the old saying goes, the eyes of the master fatten the cattle. With sensors, those eyes can now watch around the clock.

Further reading

Berckmans, D. (2017). General introduction to precision livestock farming. Animal Frontiers, 7: 6–11.

Modak, et al. (2025). Review of IoT and machine-learning applications in livestock monitoring.

Rutten, C.J. et al. (2013). Invited review: Sensors to support health management on dairy farms. Journal of Dairy Science, 96: 1928–1952.

Tangorra, F.M. et al. (2024). Review of IoT, edge and cloud computing and machine learning in dairy and livestock management.

Wathes, C.M. et al. (2008). Is precision livestock farming an engineer's daydream or nightmare, an animal's friend or foe, and a farmer's panacea or pitfall? Computers and Electronics in Agriculture, 64: 2–10.

Yin, et al. (2023). Non-contact sensing and computer vision for livestock monitoring.