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Guardians of the Herd: Inside India's Livestock and Poultry Improvement Programme

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This article surveys a year of coordinated Indian livestock research spanning genetic resource conservation, selective breeding, animal health, nutrition, and product technology. Nationwide surveys characterized native breeds — from Bachaur cattle in Bihar to the Spiti horse in the Himalayan cold desert — while a new national database and molecular genetic tools tracked population trends and flagged breeds such as Nicobari poultry and Gurej sheep as genetically vulnerable. Breeding programmes for Frieswal cattle, Murrah buffalo, and several sheep and goat lines pushed milk yields and reproductive performance upward, while diagnostic kits and vaccines for FMD, PPR, rinderpest, and BVD strengthened disease surveillance and control. Parallel work improved feed-resource utilization and mineral supplementation, and downstream product technologies converted low-value dairy, meat, and wool byproducts into shelf-stable, market-ready goods. Together, these efforts illustrate livestock improvement not as a single breakthrough but as an integrated pipeline — from breed survey to farmer livelihood — underpinning food security and rural incomes across India.

Mapping India's Animal Wealth

Before any breed can be improved or protected, it has to be found, counted, and understood. At the National Bureau of Animal Genetic Resources (NBAGR) in Karnal, scientists built a menu-driven Livestock Information Management System — essentially a national database recording population figures, breed characteristics, infrastructure, and production data for every livestock species in the country, going back to census records from 1961 onward. A parallel effort collected 'poultry informatics' from 18 states and union territories, capturing first-hand data on regional poultry varieties and the wider potential of India's poultry industry. This is not a one-time exercise. Survey teams fanned out into breed home-tracts — from the cold desert of Spiti to the coastal plains of Gujarat — to physically measure animals, record body weights, trace migratory grazing routes, and interview the farmers who keep these breeds alive. That fieldwork feeds directly into breeding, health, and conservation decisions further down the pipeline, illustrated below.

Inside the national livestock database

- **Master module** — enters new records for species, breeds, states and districts into shared reference tables.
- **Data entry & updating** — adds and revises the underlying data tables as new survey information comes in.
- **Data view** — lets authorised users browse whatever data table they need.
- **Contact** — keeps addresses for organisations working on animal genetic resources.
- **Report** — retrieves data by whichever parameters a user selects, generating custom reports on demand.

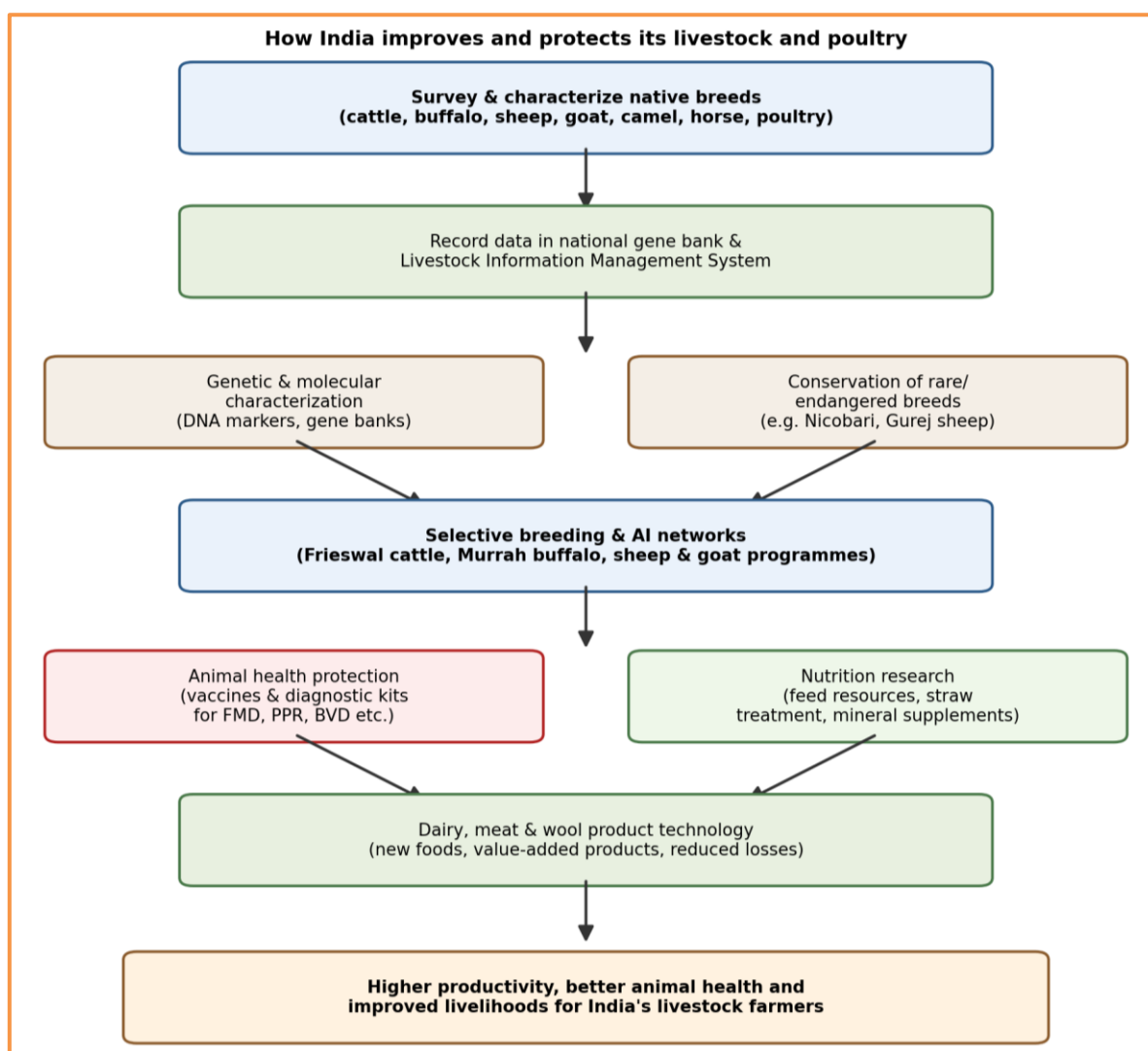


Figure 1. The broad pipeline connecting breed surveys to farmer benefit

Meeting the Breeds

Part of the year's work in 2003-2004 involved detailed, boots-on-the-ground characterization of individual breeds — many known only regionally despite their importance to local farming systems. A sample of what researchers found:

Table 1. A sample of native breeds characterized during the year, drawn from surveys across several states.

Breed	Home tract	Population / survey size	Notable finding
Bachaur cattle	Bihar (Sitamarhi, Darbhanga, Madhubani)	10,948	Housed mostly in kutchha sheds; over 90% bred by natural service
Dangi cattle	Maharashtra (Ahmednagar, Nasik, Dang)	108,197	Slow, sturdy draught bulls; lactation yield 450–550 kg
Amrithmahal cattle	Karnataka (6 districts)	14,073 surveyed	Kept in small household herds, ~3.4 animals per household
Nagpuri buffalo	Maharashtra (Nagpur, Akola, Amravati, Yavatmal)	60-village tract	Famous for very long horns, up to 53 cm, curved back over the neck
Deccani sheep	Maharashtra (Pune, Ahmednagar, Kolhapur & others)	149,942	Reaches slaughter weight (~20.7 kg) by just 8.7 months of age
Gaddi sheep & goat	Himachal Pradesh (Kullu, Chamba, Kangra)	Migratory tract	Move between valleys in winter and alpine pastures in summer
Spiti horse	Himachal Pradesh cold-desert region	4,000	Adapted to sparse, high-altitude vegetation; mostly grey coats
Ankaleshwar poultry	Gujarat (Bharuch, Narmada)	4,500	Lays 80.6 eggs/year with cream-to-brown shells

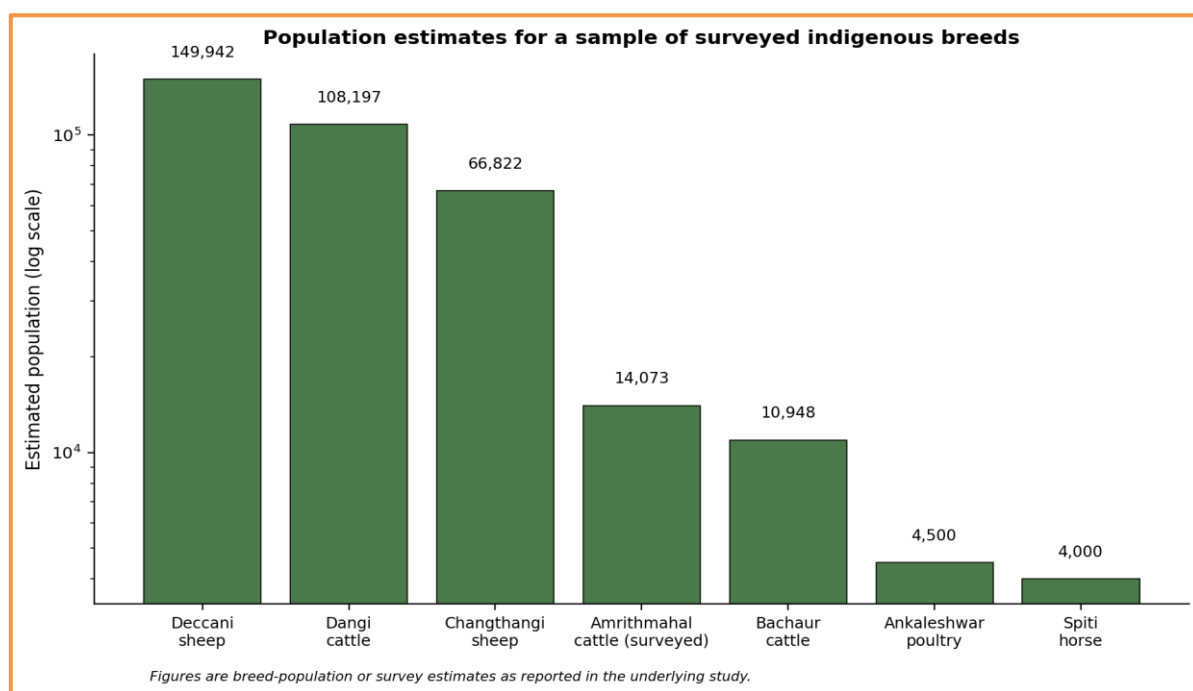


Figure 2. Estimated populations for a sample of the breeds surveyed, shown on a log scale given the wide range of values.

Some Breeds Are Running Out of Time

Not every finding was reassuring. Genetic-distance analysis at NBAGR flagged recent 'genetic bottlenecks' — a sign of shrinking genetic diversity — in Nicobari and Kashmir Favorolla poultry, as well as in Chegu and Black Bengal goats, all now marked as needing active conservation effort. Gurej and Karnah sheep, restricted to small mountain tracts in Jammu & Kashmir, were both described as highly endangered; researchers did find some cause for hope, however, discovering India's first-known four-horned sheep within the Gurej population — a small group numbering just 14 animals.

The Genetics Behind the Breeds

Alongside fieldwork, laboratories at institutes including the Indian Veterinary Research Institute (IVRI) and NBAGR pushed into the molecular details of what makes these breeds distinct. Scientists identified, for the first time, variation in the growth hormone gene of Karan Fries cattle and Murrah buffalo bulls, linked to differences in birth weight, semen quality, and mating behaviour. DNA-based techniques (RAPD-PCR) proved effective at distinguishing cattle breeds, while a buffalo ovary protein was identified as a potential marker for detecting pregnancy and oestrus — a discovery with real practical value for buffalo breeders trying to time artificial insemination. A first-of-its-kind family tree ('neighbour-joining tree') of Indian goat breeds alongside wild goats revealed three distinct genetic groupings and hinted at a more complex ancestry for domestic goats than previously assumed. Similar genetic-distance work on buffalo populations found that Kerala buffaloes form a genetically distinct group, while Bhadawari and Tarai buffalo populations are closely related to one another.

Breeding for Better Productivity

Characterizing breeds is only half the picture — the other half is actively improving them. The flagship cattle programme, Frieswal, aims to develop a new milk-producing strain suited to India's climate, targeting 4,000 litres of milk in a 300-day lactation. Operating across 45 Military Farms nationwide, the programme had grown its herd by 48% over three years, with more than 735,000 doses of Frieswal semen banked for future breeding. Parallel programmes tracked and improved indigenous breeds like Hariana, Gir, Ongole and Tharparkar cattle, while the Network Project on Buffalo Improvement coordinated progeny testing of Murrah bulls across six research centres, identifying top-performing sires whose daughters produced

nearly 2,000 kg more milk than the herd average. In sheep and goats, targeted breeding produced measurable gains too: Bharat Merino sheep emerged as a promising substitute for imported fine-wool breeds, Avikalin sheep showed potential as a dual meat-and-wool breed, and crossbreeding Garole rams with Malpura ewes lifted twin-lambing rates to 45%, hinting at a new prolific sheep strain for Indian conditions.

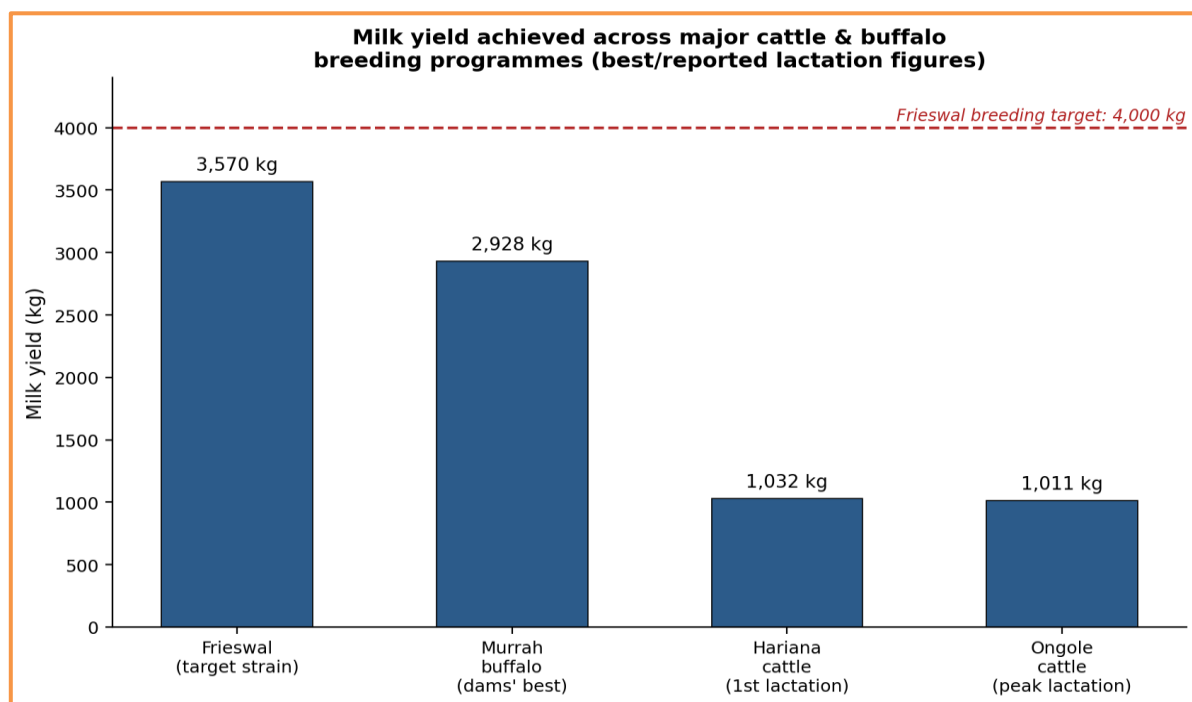


Figure 3. Milk yield achieved by major cattle and buffalo breeding programmes during the year, compared against the Frieswal programme's long-term target.

Protecting Animal Health

Disease remains one of the biggest threats to livestock productivity in India, and a major share of the year's research went into better vaccines and faster, cheaper diagnostic tools. Foot-and-mouth disease (FMD) — endemic in much of the country — was tracked through molecular surveillance of outbreak strains, with over 1,100 field virus isolates catalogued in a national repository to guide vaccine strain selection.

Table 2. A sample of diagnostic and vaccine tools developed or advanced during the year.

Disease	Tool developed	Why it matters
Rinderpest	Competitive ELISA diagnostic kit	Validated by the World Reference Laboratory (OIE); production cost about a quarter of imported kits
Peste des Petits Ruminants (PPR)	Sandwich-ELISA diagnostic kit + live attenuated vaccine	Vaccine safe even during pregnancy, immunity lasting over 3 years
Bovine Viral Diarrhoea (BVD)	Recombinant antigen-based ELISA	First indigenous alternative to imported detection kits
Classical Swine Fever	Non-isotopic DNA probe	Detects viral genome directly in spleen, lymph nodes and tonsils
Porcine Reproductive & Respiratory Syndrome	Recombinant antigen ELISA (in development)	Aims to sharply cut the cost of diagnosis versus imported kits

Beyond these headline tools, national serosurveys tracked the prevalence of major diseases — finding brucellosis in 14.7% and infectious bovine rhinotracheitis (IBR) in nearly 19% of animals tested — while a weather-based forecasting system for 15 animal diseases achieved 75–98% prediction accuracy across India's different agro-climatic zones, giving veterinary authorities valuable lead time to prepare. Other disease programmes moved forward too. Screening for bluetongue virus turned up antibodies in roughly one in six serum samples tested nationally, and a trial vaccine using a Bhopal isolate of the virus entered testing in experimental sheep. Investigations into haemorrhagic septicaemia identified the bacterium

behind it across a striking range of hosts — cattle, buffalo, sheep, goat, pig, poultry, and even captive lions, tigers, dogs and leopards — while new PCR-based tests made it possible to identify gastrointestinal parasites directly from cattle, goat and yak faecal samples for the first time.

Feeding the Herd

Good genetics and good health only translate into productivity if animals are properly fed — and much of rural India's livestock subsists on crop residues and grazing rather than commercial feed. A detailed feed-resource census in Karnataka found the state's ruminant population had access to 40.3 million tonnes of feed a year, dominated by crop residues such as sugarcane tops, maize stover and rice straw, and confirmed that the overall dry-matter supply was adequate — though it varied widely by district. Several innovations targeted the low-quality roughage that makes up much of that diet. A fabricated thresher-cum-treatment unit let farmers treat straw with urea and molasses at the point of threshing, without extra labour or time. Researchers also developed a 'chelated minerals' technology — binding trace minerals like copper, zinc and manganese to milk-whey and soybean proteins to make them far more absorbable — matching the composition of costlier imported products. In field trials, correcting area-specific mineral deficiencies resolved 80–90% of reproductive health problems in crossbred cattle, directly lifting farmer profitability.

- Chaffing green maize before feeding cut energy expenditure and boosted crossbred cattle body-weight gain.
- Cottonseed hulls and bioenriched soybean hulls proved viable, cheaper substitutes for wheat straw in growing calves' diets.
- A fungal culture (*Orpinomyces* sp.) added to wheat-straw feed mixtures raised crossbred calf growth rates by nearly 16%.
- Drying aflatoxin-contaminated feed at 120°C for 2–3 hours achieved the greatest reduction in toxin levels.

From Farm to Table

The final link in the chain is turning animal produce into safe, marketable, value-added products — work carried out largely at the National Dairy Research Institute (NDRI) and allied meat and wool laboratories. Whey, a dairy byproduct otherwise discarded or expensively treated, was reengineered into a shelf-stable jaljeera drink and a whey-based lassi, giving small dairy processors a way to capture value from a waste stream. A low-fat, sugar-free frozen dessert was formulated for diabetic patients using artificial sweeteners and bulking agents, remaining stable for up to 90 days. On the meat side, spent (culled) goats and hens — usually the lowest-value animals in a flock — were turned into an array of shelf-stable products: chevon (goat meat) pickle, samosas, nuggets and kofta, plus a chicken meat spread from spent hens. Independent quality testing found that chevon pickle alone could remain acceptable for up to six months at room temperature, with strong market potential for towns, cities, and remote defence postings where fresh meat isn't reliably available. In wool, blending fine crossbred sheep wool with coarser native wool produced handloom blankets nearly 40% cheaper than market alternatives, while preserving softness and warmth.

Beyond Cattle and Buffalo

India's livestock research doesn't stop at cattle and buffalo. Specialized national research centres work on species suited to the country's most extreme environments — desert camels, high-altitude yaks and mithun, and working horses — each with its own breeding, health and management challenges.

Table 3. A sample of research on camels, equines, yaks and mithun

Species	Key finding	Notable detail
Camel	Purpose of camel-keeping varies sharply by region; migration distances differ between Bikaner (short) and Pali (long) districts of Rajasthan	Camel lactoferrin found to combine two functions in one protein — binding iron like both lactoferrin and transferrin

Species	Key finding	Notable detail
Equine (horses & mules)	Balanced, locally-sourced rations improved health and reproduction in nutrient-deficient equines	About 1 in 5 sampled equines showed sub-clinical lead toxicity, an environmental health concern
Yak	Induction of oestrus succeeded in 7 of 8 female yaks using a hormone protocol	Herbarium and mineral analysis of local tree fodder built for West Kameng and Twang, Arunachal Pradesh
Mithun	Growth-hormone assay developed and validated for the first time in this semi-domesticated bovine	About 15 species of rumen ciliates (microbes aiding digestion) identified in mithun for the first time

Why It All Matters

Taken together, this single year of work illustrates something easy to overlook: livestock improvement is not one breakthrough but a continuous, coordinated pipeline — counting and conserving genetic diversity, breeding for better productivity, protecting animals from disease, feeding them efficiently, and finally converting their produce into products that reach families and markets safely. For the millions of Indian households whose livelihoods depend on a handful of animals, that quiet, cumulative science is what keeps the herd — and the household — productive from one year to the next.

References

1. Department of Agricultural Research and Education (DARE) / Indian Council of Agricultural Research (ICAR). Livestock and Poultry Improvement and Management. In: DARE/ICAR Annual Report 2003–2004. New Delhi: ICAR; 2004.
2. National Bureau of Animal Genetic Resources (NBAGR), Karnal — Livestock Information Management System and breed characterization studies.
3. Project Directorate on Cattle, Meerut — Frieswal cattle breeding programme.
4. Central Institute for Research on Buffaloes, Hisar, and partner centres — Network Project on Buffalo Improvement.
5. Central Sheep and Wool Research Institute, Avikanagar — Network Project on Sheep Improvement.
6. Central Institute for Research on Goats, Makhdoom — goat breed conservation and improvement studies.
7. Project Directorate on Foot-and-Mouth Disease, Mukteswar, and Indian Veterinary Research Institute (IVRI), Izatnagar — FMD, PPR, BVD and rinderpest diagnostics and vaccine research.
8. National Dairy Research Institute (NDRI), Karnal — dairy product technology and animal nutrition research.
9. Central Avian Research Institute (CARI), Izatnagar, and Project Directorate on Poultry, Hyderabad — poultry breeding and nutrition research.