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Monthly Magazine for Feed Industry

## Structural Shifts Reshape India's Feed, Poultry, and Dairy Landscape

## Strategic framework to boost poultry production

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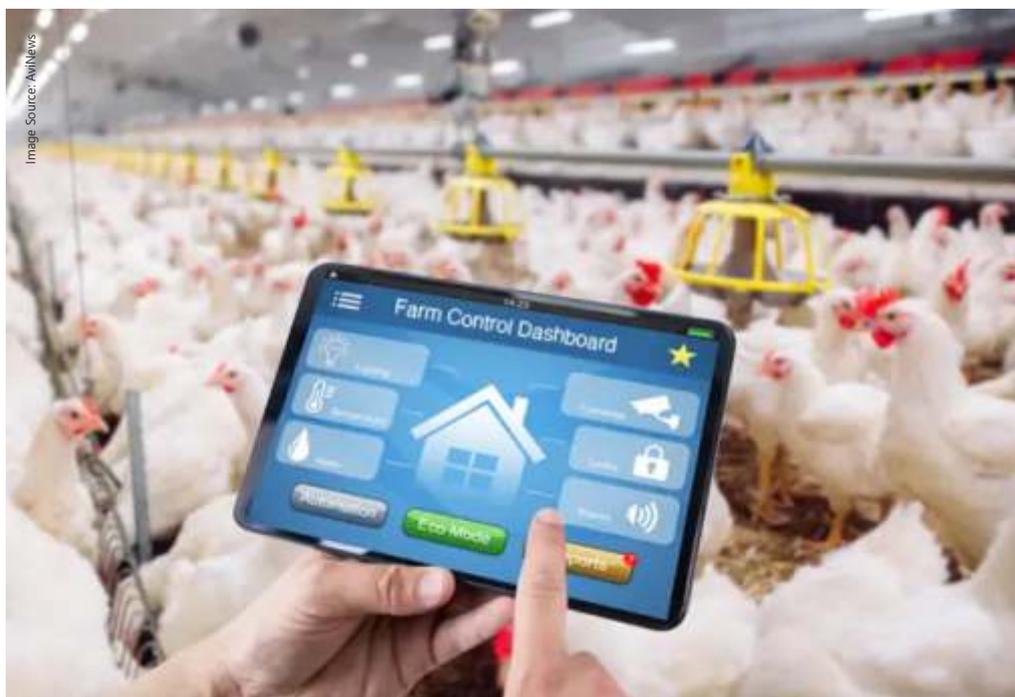
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# Indian Startup Livestockify Brings Real-Time AI Monitoring to Poultry Farms



Indian agritech startup Livestockify is rapidly emerging as a key driver of digital transformation in poultry farming by leveraging IoT deployments and AI-based health monitoring systems to enhance productivity and flock welfare. Its technology enables continuous, real-time tracking of poultry health, allowing farmers to detect diseases early and reduce losses caused by delayed interventions. Founded in 2023 by Akhil Reddy K, Chitra A, and Sanjay Reddy, Livestockify was established to make poultry farming more data-driven, predictive, and sustainable. The startup

addresses high mortality rates, a persistent challenge in the sector due to manual and reactive monitoring practices. By integrating smart hardware with advanced analytics, Livestockify translates complex health and environmental data into actionable insights that improve farm efficiency, profitability, and animal welfare.

The core of Livestockify's solution is an IoT platform that collects sensor-based health indicators and environmental metrics such as temperature, humidity, and air quality. AI-driven diagnostic models analyse these datasets to identify early signs of stress,

infection, or abnormal behaviour, generating alerts that enable timely interventions before problems escalate into large-scale outbreaks. By correlating health data with feed consumption and environmental conditions, the system also helps optimise feed efficiency and overall farm management. Currently serving over 120 poultry farms across India, Livestockify has recorded reductions in disease-related losses and improvements in operational efficiency. Its growth has been supported by participation in the Kotak BizLabs Accelerator Programme, which provided mentorship, industry exposure, and guidance on scaling, as well as early incubation at IIMA Ventures, which helped the startup access a broader ecosystem of farmers, traders, and service providers. With its innovative approach, Livestockify is demonstrating that homegrown agritech solutions can achieve global-grade precision and sustainability. By enabling smarter, data-driven poultry farming, the startup is poised to strengthen India's poultry sector, making it more resilient, efficient, and profitable.

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# Strategic framework to boost poultry production by cost-effective feed formulations, integrated farm practices and disease control in India

by **Prof (Dr) P K Shukla**, Department of Poultry Science, College of Veterinary Science and Animal Husbandry, Mathura



Prof (Dr) P K Shukla

## Abstract

India's poultry sector is a critical component of national food security, rural livelihoods, and agribusiness growth. Constrained by volatile feed costs, fragmented farm practices, and recurrent disease outbreaks, the sector requires a coordinated strategy that reduces production cost while improving productivity and biosecurity. This article proposes a comprehensive, evidence-guided strategic framework that integrates (1) cost-effective, nutritionally balanced feed formulation, using alternative raw materials and precision nutrition; (2) integrated farm practices spanning housing, environment control, waste and water management, and value chain integration; and (3) robust disease prevention, surveillance and response systems incorporating vaccination, bio surveillance, and antimicrobial stewardship. The framework is operationalized through policy instruments, capacity development, public-private partnerships, and market-based incentives. Implementation at scale will require coordinated efforts among central and state governments, research institutions, industry, and producer collectives. The proposed framework aims to increase flock productivity, reduce feed costs as a proportion of production cost, lower disease incidence, and improve environmental and economic sustainability of Indian poultry production.

## 1. Introduction

Poultry production in India has witnessed rapid expansion in recent

decades, driven by rising incomes, changing diets, and urbanization. Despite growth, the sector faces persistent structural challenges: feeds constitute 60–70% of production costs, raw material price volatility (notably maize and soybean) undermines margins, farm practices are often heterogeneous and suboptimal, and infectious diseases (including avian influenza, ND, and bacterial enteritis) periodically cause substantial losses. In addition, concerns about environmental impacts, antimicrobial resistance (AMR), and welfare standards influence market access, especially for export and organized retail.

A systems approach—linking feed science, on-farm management, veterinary public health and value chain organization—is necessary to achieve sustainable intensification. This article outlines a strategic framework that integrates cost-effective feed formulation, integrated farm practices, and disease control measures tailored to India's agro-ecological and socio-economic context. The framework prioritizes measurable performance indicators, scalability, and policy levers.

## 2. Objectives and guiding principles

### 2.1 Primary objectives

1. Reduce feed cost per kg live weight/egg produced by 15–30% within 3–5 years through alternative ingredients, precision nutrition and supply-chain efficiencies.
2. Improve flock productivity metrics (e.g., feed conversion ratio (FCR), average daily gain (ADG), egg

mass per hen) by 10–20% via integrated farm management.

3. Reduce disease incidence and mortality by 40–60% through strengthened preventive measures and rapid response systems.
4. Minimize antimicrobial usage growth and support AMR mitigation.

## 2.2 Guiding principles

- Contextualization: Solutions must be regionally adapted (feed resource base, climate, farm scale).
- Cost-effectiveness: Prioritize interventions with high benefit-cost ratios.
- Sustainability: Environmental and social sustainability embedded (waste recycling, resource efficiency, worker safety).
- Evidence-based: Use research, pilot trials and monitoring to iterate interventions.
- Inclusiveness: Smallholders and contract farmers included via cooperatives and aggregation models.
- Regulatory alignment: Align with national animal health, feed, and environmental regulations.

## 3. Component A — Cost-effective feed formulations

Feed cost reduction requires both supply-side and formulation innovations. This component has five pillars: alternative raw materials, ingredient processing and value addition, precision nutrition and phase feeding, feed manufacturing efficiency, and market/institutional mechanisms.

### 3.1 Alternative raw materials and ingredient diversification

- Objective: Reduce dependence on maize and soybean meal by sourcing locally available, lower-cost alternatives while preserving nutrient density.
- Potential alternatives:
  - o Cereals: broken rice, bajra (pearl millet), sorghum;
  - o Oilseed cakes: mustard cake, de-oiled rice bran (DORB) treated for palatability;
  - o Legumes and pulses: dehulled pulses, guar meal (with detoxification);
  - o Agro-industrial byproducts: brewer's dried grains, distillers dried grains with solubles (DDGS), oilseed meals from castor (detoxified), groundnut cake (graded for aflatoxin);
- Novel ingredients: insect meal (black soldier fly larvae), single-cell proteins, algae (microalgae) for specialty nutrients where economically viable.

### Action points:

- o Conduct region-wise ingredient availability mapping and digestible nutrient profiles.
- o Implement small-scale trials to validate ingredient inclusion levels and effects on performance and product quality.
- o Develop detoxification and processing protocols (e.g., heat,

solvent extraction, fermentation) to render certain byproducts usable.

### 3.2 Ingredient processing and value addition

- Techniques: Fermentation (improves protein digestibility, reduces anti-nutrients), extrusion, pelleting (improves FCR), enzyme treatment (phytase, carbohydrases), heat treatment for toxin reduction.
- Benefits: Improves nutrient bioavailability, reduces need for expensive synthetic additives, and allows inclusion of higher levels of local byproducts.

### 3.3 Precision nutrition and phase feeding

- Concept: Match nutrient

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supply to the bird's physiological stages (starter/grower/finisher; layers' phase feeding), and use digestible amino acid formulation rather than crude protein to reduce nitrogen excretion and feed cost.

- Tools: Least-cost formulation software using local ingredient price feeds; adoption of digestible amino acid systems (SID amino acids) and net energy models where feasible.
- **Additives for efficiency:** Enzymes (phytase, xylanase), probiotics/prebiotics, organic acids, and feed flavor enhancers to improve intake and nutrient utilization. Evaluate cost/benefit before adoption.

### 3.4 Feed manufacturing and logistics optimization

- Scale-appropriate manufacturing: Encourage community feed mills and contract manufacturing to lower logistics costs for smallholders.
- Quality control: Establish standardized quality and adulteration checks (moisture, mycotoxins, nutrient assays), supported by public labs or mobile testing kits.
- Supply contracts and buffer stocking: Price hedging via forward contracts, cooperative bulk purchasing and strategic reserves to smooth price volatility.

### 3.5 Institutional and market mechanisms

- Public support: Incentives for R&D in alternative ingredient processing; tax relief for local feed mills;

subsidies or low-interest loans for feed processing facilities.

- Extension services: Training extension agents and feed formulators at state livestock universities and Krishi Vigyan Kendras (KVKs) to promote alternate ingredient use.
- Quality assurance labelling: Develop a voluntary certification indicating nutrient adequacy and safety to build buyer confidence.

### 4. Component B — Integrated farm practices

Improved on-farm practices enhance resource use efficiency, bird welfare and disease resilience. This component covers farm design and housing, environmental control, nutrition management, water and waste management, and integration with value chains.

#### 4.1 Housing and environmental control

- Design principles: Thermal comfort, ventilation, ease of cleaning, bio secure entry points, and modularity for flock segmentation.
- Climate adaptation: Insulation, evaporative cooling or tunnel ventilation where necessary, and microclimate control for tropical and semi-arid regions.
- Flooring and litter management: Use of deep litter systems with periodic turning, or slatted floors where feasible, coupled with composting of litter to recycle nutrients.

#### 4.2 Stocking density and welfare standards

- Adopt density guidelines

that optimize productivity and reduce stress.

Incorporate enrichment and lighting programs to improve growth and egg production.

#### 4.3 Feed and water management at farm level

- Feeding management: Proper feeder design to minimize spillage; scheduled feeding to reduce wastage; use of phase-specific rations.
- Water quality: Regular testing, filtration where necessary; water medicators for precise therapeutic delivery when indicated.

#### 4.4 Biosecurity and farm hygiene

- Entry controls: Footbaths, change of clothing, visitor logs.
- Segregation: Separate newborns and growers from older flocks; all-in/all-out system for commercial units.
- Cleaning protocols: Standard operating procedures (SOPs) for cleaning, disinfection, downtime between flocks.

#### 4.5 Waste management, circularity and resource efficiency

- Manure to value: Biogas digesters for energy, composting for manure fertilizer, and palletisation for sale as organic fertilizer.
- Water recycling: Treatment ponds and constructed wetlands for effluent management.
- Energy efficiency: Solar water heating, solar panels for lighting and pump systems.

#### 4.6 Integration with value chains and market linkages



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- Collective models: Farmer producer organizations (FPOs), cooperatives, and contract farming to secure inputs and output markets.
- Traceability: Simple recordkeeping and barcoding for larger operations to meet quality and export standards.
- Value addition: On-farm primary processing (e.g., egg grading and packaging), cold-chain linkages for market premium.

### 5. Component C — Disease control, surveillance and antimicrobial stewardship

Disease control is the backbone of productivity and market access. India requires integrated animal health systems combining prevention, surveillance, laboratory diagnostics, outbreak response, and rational antimicrobial use.

#### 5.1 Preventive veterinary measures

- Vaccination programs: Structured vaccination schedules based on risk profiling (ND, IBD, IB, avian influenza where appropriate) and cold chain management. Promote locally validated vaccines and autogenous vaccines when indicated.
- Biosecurity upgrade: Farm-level interventions described above with emphasis on human behaviour change and enforcement.

#### 5.2 Surveillance and early warning

- Passive and active surveillance: Strengthen routine reporting from veterinary field units, strengthen syndromic

surveillance, and periodic Sero-surveys.

- Laboratory network: Upgrade regional veterinary diagnostic labs for rapid pathogen identification (molecular diagnostics) and antimicrobial susceptibility testing.
- Data systems: Centralized, real-time data dashboards to detect anomalies and trigger responses.

#### 5.3 Outbreak response and contingency planning

- Preparedness plans: Standardized contingency plans for major notifiable diseases with defined roles, compensation mechanisms, and movement controls.
- Rapid response teams: Trained multi-disciplinary teams for ring vaccination, culling (where needed), decontamination, and communication.

#### 5.4 Antimicrobial stewardship and AMR mitigation

- Guidelines: Implement evidence-based therapeutic guidelines; restrict growth-promoter antibiotics; encourage prophylaxis only under veterinary prescription.
- Monitoring: Track antimicrobial sales and farm-level use; integrate AMR testing into surveillance.
- Alternatives: Encourage vaccines, improved biosecurity, probiotics, competitive exclusion products as alternatives to routine antibiotic use.

#### 5.5 Human health interface and One Health

- Cross-sector

coordination: Strengthen coordination with public health for zoonotic disease surveillance (influenza strains, salmonella, campylobacter).

- Worker safety: Provide PPE, training, and occupational health measures to farm workers to limit zoonotic risks and assist early detection.

### 6. Enablers—Policy, finance, capacity and research

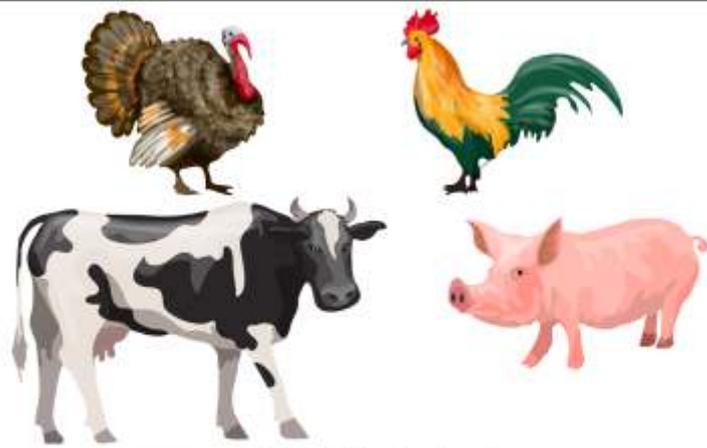
For the framework to be implemented at scale, specific enabling actions are required.

#### 6.1 Policy and regulatory interventions

- Feed regulation modernization: Facilitate registration and safe use of novel feed ingredients and additives; transparent standards for mycotoxin limits and ingredient claims.
- Incentives: Tax incentives or capital subsidies for processing units, modular housing upgrades, solar installations and waste-to-energy projects.
- Trade and market rules: Export promotion for processed poultry products and standards harmonization.

#### 6.2 Finance and risk management

- Credit models: Collateral-free micro-credit for smallholders tied to technical assistance; blended finance for medium-scale integrators.
- Insurance: Index-based livestock insurance covering disease outbreaks, extreme weather, and feed price



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shock mitigation.

- Price risk tools: Commodity exchanges and futures for maize/soy to allow hedging by larger feed mills and integrators.

### 6.3 Capacity building and extension

- Training modules: Develop standardized curricula on feed formulation, biosecurity, and farm management delivered through universities, KVKs, NGOs, and industry.
- Digital extension: Mobile apps for feed formulation calculators, disease reporting, and access to veterinary telemedicine.
- Demonstration farms and pilots: Regional demonstration units to showcase best practices and cost-benefit evidence.

### 6.4 Research and innovation

- R&D priorities: Nutrient digestibility of local ingredients, mycotoxin mitigation, insect protein scaling, vaccine development for local pathogen variants, and socio-economic studies on adoption constraints.
- Public-private partnerships (PPP): Incentivize industry collaboration with research institutes for translational R&D.

## 7. Implementation roadmap and monitoring

### 7.1 Phased implementation

- Phase 1 (0–12 months): Baseline assessments—ingredient mapping, hotspot identification for disease and feed insecurity; pilot projects in diverse agro-

ecologies.

- Phase 2 (12–36 months): Scale up successful feed formulations and farm models; roll out vaccination and surveillance strengthening; create market linkages and finance mechanisms.
- Phase 3 (36–60 months): Institutionalize best practices, expand laboratory networks, integrate AMR surveillance, and evaluate socio-economic impacts.

### 7.2 Monitoring and evaluation (M&E)

- Key performance indicators (KPIs): Feed cost/kg live weight, FCR, mortality rate, egg production per hen, antimicrobial usage metrics, incidence of notifiable diseases, adoption rates of feed alternatives and biosecurity measures.
- Data collection: Periodic farm surveys, veterinary reporting, feed mill QC reports and market price monitoring.
- Learning loops: Quarterly reviews to refine formulations, vaccine schedules, and extension materials.

## 8. Case scenarios—hypothetical illustrations

### 8.1 Smallholder cluster in semi-arid region

A group of 100 smallholders forms an FPO and establishes a community feed mill that processes millet, treated DORB and mustard cake into a cost-optimized grower mash. With enzyme inclusion and pelleting, FCR improves by 8% and feed cost per kg

reduces by 20%. Litter composting and a communal biogas plant provide cooking fuel, while a coordinated vaccination schedule reduces mortality.

### 8.2 Medium commercial integrator in humid coastal state

An integrator shifts 15% soybean inclusion to defatted insect meal produced from local organic waste, improves housing ventilation, and adopts phase feeding. Laboratory surveillance detects low-level ND seroconversion prompting booster vaccination — outbreak averted. AMU decreases by 35% through improved biosecurity and targeted therapeutics.

## 9. Risks, barriers and mitigation

### 9.1 Barriers

- Acceptability and perception: Farmers may distrust novel ingredients or changes in practice.
- Quality control challenges: Upgrading labs and ensuring consistent feed quality is resource-intensive.
- Market volatility: Persistent price shocks in staple cereals could undercut gains.
- Regulatory bottlenecks: Slow approval for novel feed ingredients or vaccines.

### 9.2 Mitigation strategies

- Behavioural change programs: Demonstration plots, farmer field schools and financial incentives for early adopters.
- Public lab network: Invest in regional diagnostic and feed testing centres and mobile kits.
- Risk pooling: Promote

cooperatives and insurance to buffer price volatility.

Regulatory fast tracks: Time-bound pilot approvals for novel inputs with post-market surveillance.

**10. Policy recommendations**

1. National feed strategy: Develop a national feed security roadmap mapping alternate ingredient potential, processing infrastructure and quality assurance.
2. Incentivize decentralized feed mills: Subsidies or low-interest loans for community mills and pelletizers.
3. Strengthen veterinary extension and diagnostics: Expand lab capacities and integrate digital disease reporting.

4. AMR action plan enforcement: Implement stewardship in poultry with monitoring and enforceable guidelines on growth promoters.

5. Support R&D: Funding for translational research on insect protein scaling, fermentation of agro-byproducts and vaccine innovation.

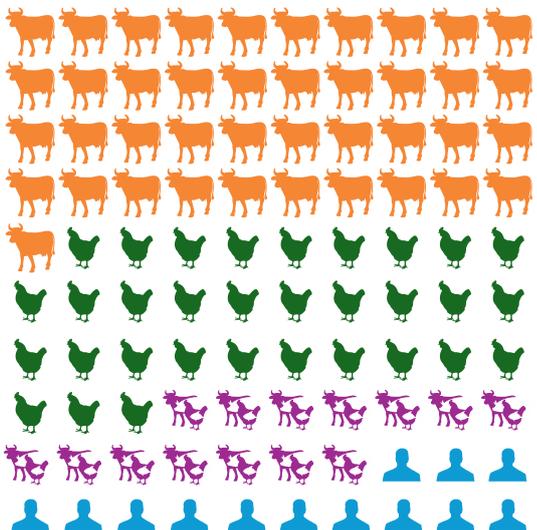
6. Market facilitation: Support formation of FPOs, cold-chain infrastructure and grade-and-pack standards for eggs and meat.

**11. Conclusion**

India has the opportunity to transform its poultry sector into a more productive, resilient and sustainable industry by adopting a deliberately integrated strategy that targets the three interdependent levers:

cost-effective feed formulations, integrated farm management, and robust disease control systems. Economic gains from reduced feed costs and improved productivity, combined with better disease outcomes and lower antimicrobial reliance, will strengthen farmer livelihoods and national food security. Success depends on multi-stakeholder collaboration, regionally adapted interventions, and sustained public investment in research, capacity building and regulatory modernization. The proposed strategic framework provides a pragmatic pathway for policy makers, researchers, industry and producers to operationalize this transformation.

# Structural Shifts Reshape India's Feed, Poultry, and Dairy Landscape



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— 13%

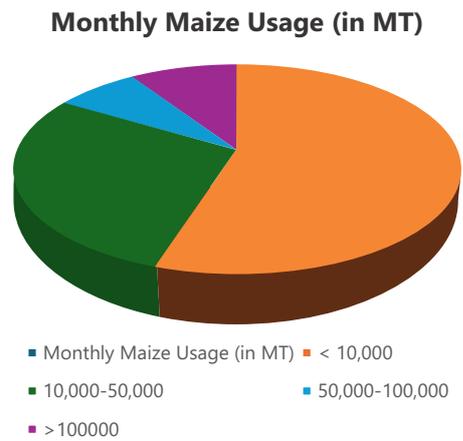
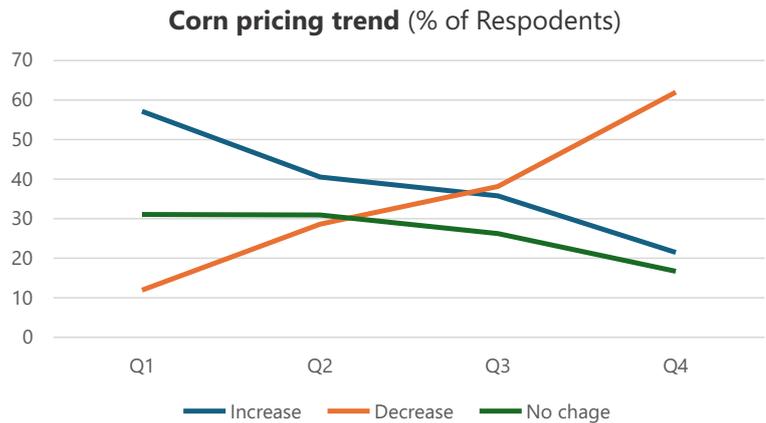
Think Grain Think Feed has compiled its 5th Indian Feed Survey, drawing insights from 135 participants. The respondents include 56 cattle feed producers, 43 poultry feed producers, 19 multi-species feed manufacturers (covering aquaculture and swine), and 17 nutritionists and consultants, collectively representing over 170 feed mills across India.

The survey estimates a total monthly production capacity of 4.37 million metric tonnes (MMT), with an average capacity utilization exceeding 90%.

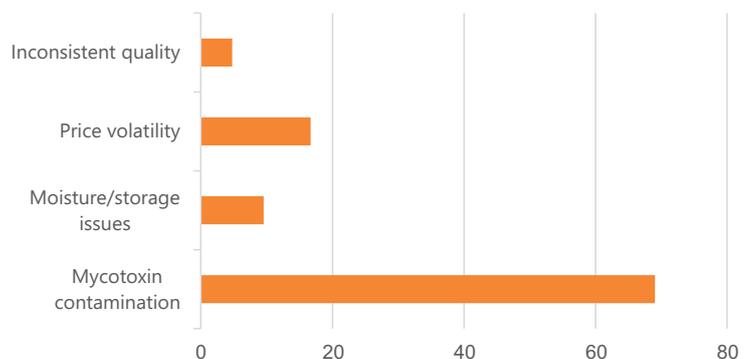
Detailed findings and expert perspectives are presented in the report below, along with curated quotes from industry leaders.

**Summary**

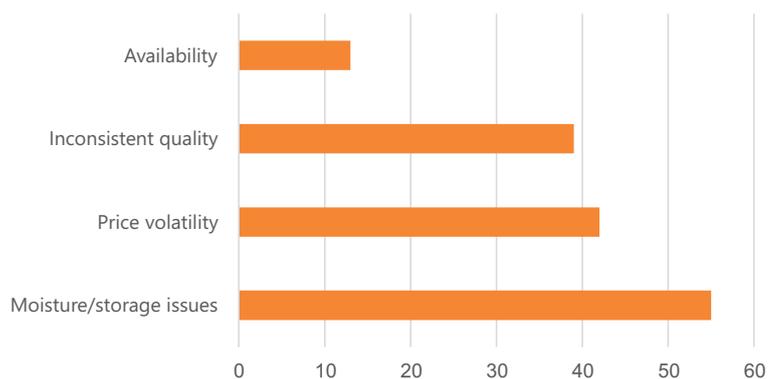
- Corn and energy source prices showed a clear reversal during the year. While **57%** of respondents reported price increases in **Q1**, the share steadily declined to **21%** by **Q4**. Conversely, expectations of price decreases strengthened sharply, rising to nearly **62%** in **Q4**, indicating a strong downward price sentiment toward year-end.
- Average corn prices during the survey period largely ranged **between INR 19.4–24.9 per kg**, with reported **lows of INR 17** and **highs reaching INR 28**, reflecting significant price volatility across regions and time periods.
- Production capacity is largely concentrated in smaller feed mills, with **55% of respondents operating below 10,000 tonnes**, followed by **29% in the 10,000–50,000 tonne range**. **Only 17% of respondents have capacities above 50,000 tonnes**, indicating limited large-scale capacity within the sample.
- **Mycotoxin contamination emerged as the biggest challenge in maize**, reported by **69% of respondents**, followed by **inconsistent quality** and **price volatility**, highlighting persistent raw material risk in feed formulation.
- **83%** of respondents preferred **broken rice** as an alternative energy source, followed by **13% preferring millet or wheat**, while the remainder opted for multiple other options.
- **Soybean prices showed a clear reversal during the year**. In Q1 and Q2, a larger share of respondents reported **stable to declining prices**, while the proportion indicating price increases remained below 30%. Sentiment shifted in Q3, with **43% reporting price increases**, and strengthened sharply in Q4, where **over 76% of respondents indicated rising soybean prices**, while expectations of price declines were negligible.
- Average soybean meal (SBM) prices during the survey period largely ranged **between INR 33.8–42.6 per kg**, with reported **lows of INR 30** and **highs reaching INR 50**, indicating significant price volatility.
- SBM usage is skewed toward smaller volumes, with **55% of respondents consuming less than 2,000 tonnes**. About **21% use more than 5,000 tonnes**, including **19% exceeding 10,000 tonnes**, while **nearly 5% reported not using SBM** at all.



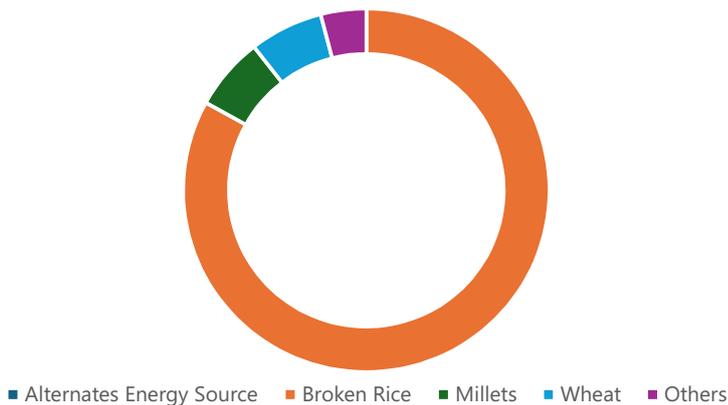
**Key Challenges in Maize Quality (% of Respondents)**



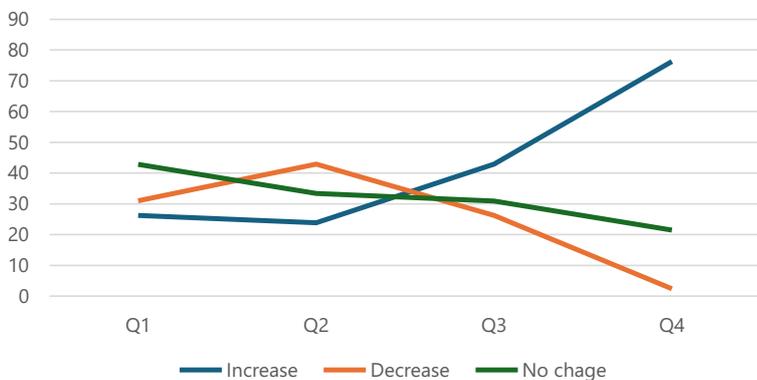
**Other Maize-Related Issues Reported (Number of Mentions)**



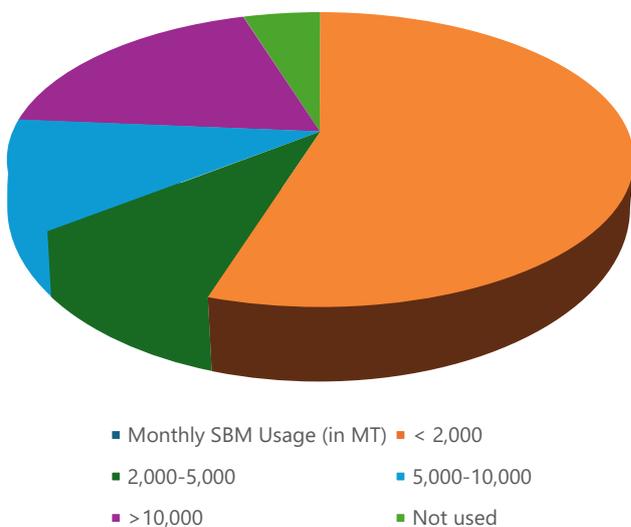
Alternate Energy Sources



Soybean pricing trend (% of Respondents)



Monthly SBM Usage (in MT)



- **Adulteration emerged as the biggest challenge in SBM**, cited by **50% of respondents**, with **DDGS and silica** identified as the most common adulterants. Other key concerns included **price volatility** and **inconsistent protein quality**, impacting formulation reliability and performance outcomes.
- **Nearly 79% of respondents preferred DDGS and rapeseed meal as alternate protein sources**; however, **maize-based DDGS was associated with significant challenges related to fungal contamination and mycotoxins**, limiting its wider acceptance.
- **DDGS inclusion levels** remain moderate, with **2–5% usage in poultry diets and higher inclusion of 5–10% in dairy rations**, reflecting species-specific risk considerations.
- **De-oiled Rice Bran (DORB)** is widely used, with over **97% of respondents** incorporating it into their formulations. Most users reported inclusion levels in the **10–15% range**, while **14% indicated usage exceeding 20%**, underscoring its importance as a cost-effective energy and protein source.
- Average prices of DORB ranged between **INR 11.3-14.7 per kg**, with reported values spanning from a minimum of **INR 9** to a maximum of **INR 18.5**.
- **Stocking** remained the primary risk management strategy adopted by feed millers and integrators.
- **Over 90% of respondents reported an expected increase in feed production capacity over the next 12–24 months**, with expansion levels ranging from **less than 5% to as high as 50%**. The primary focus of expansion is **cattle feed**, followed by **poultry feed**.

India's animal nutrition industry is undergoing a series of structural shifts that are quietly redefining feed manufacturing, raw material sourcing, and farm-level productivity. From changing poultry feed dynamics to quality-linked milk procurement and regional feed corridors, industry experts point to a sector transitioning from volume-driven growth toward efficiency, quality, and resilience.

# ANTOX

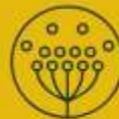


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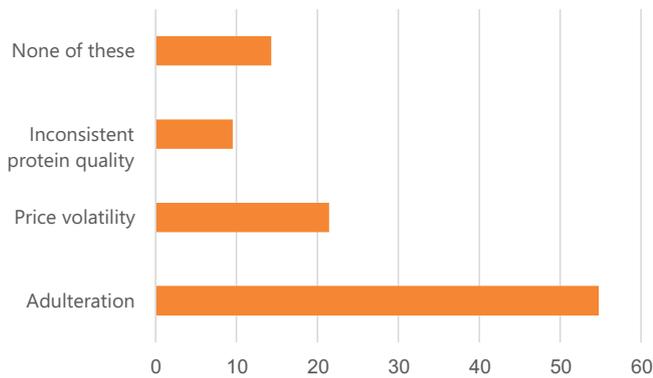
Triple-action protection:  
High efficacy against  
Mycotoxins, Chemical  
toxins, and Endotoxins



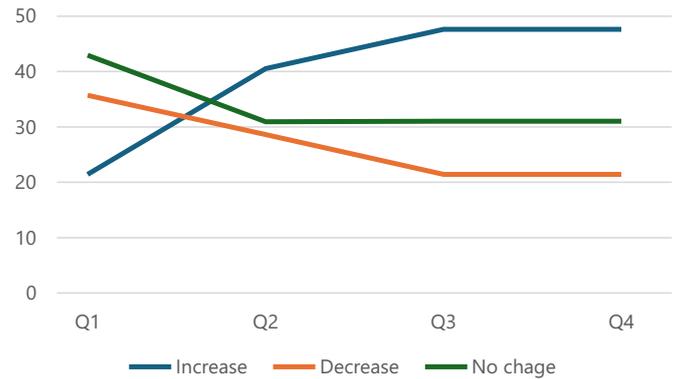
Comprehensive level of  
net-binding efficiency



## Key Challenges in SBM Quality (% of Respondents)



## DORB pricing trend (% of Respondents)



### Poultry Feed Manufacturing Moves Beyond Broilers

Fifteen years ago, broiler feed dominated the commercial feed landscape. Today, increasing integration in the broiler sector has steadily pushed independent feed

millers toward layer feed manufacturing.

"Fifteen

years ago, most commercial feed millers were focused on broiler feed; however, increasing integration in the broiler sector has steadily pushed independent millers toward layer feed manufacturing," said Dr SK Bhardwaj, poultry expert.

This shift has coincided with persistent challenges in grain handling, particularly maize moisture management. High post-harvest moisture remains a critical risk factor for feed quality and storage stability.

"High maize moisture remains a persistent challenge, sun drying is often preferred over short-



duration batch drying, as excessive heat can 'cook' the grain, alter its texture, elevate toxin risks, and shorten storage life," Dr Bhardwaj noted. While controlled drying below 60°C offers a technical solution, high capital costs have limited wider adoption.

### Raw Material Quality Under Pressure

Across both poultry and dairy feed segments, securing consistent-quality raw material has emerged as the dominant concern for manufacturers.

"For feed manufacturers, securing quality raw material is the biggest challenge," said Dr S. Ramamoorthi of Krishi Nutrition. "The damaged soybean crop in



next crop cycle."

Maize quality, in particular, has shown visible deterioration in key sourcing regions. According to Dr S S Pattabhirama of Nanda Group, recent procurements

from parts of Karnataka highlight a worrying trend.

"Maize quality has visibly deteriorated, particularly in recent procurements from Davanagere, Chitradurga, and Haveri,

where grain counts have risen to 400 or more per 100 grams compared to the earlier norm of around 350—an indicator of immature harvesting and lower nutrient density," he said.

Soybean meal quality has also become more variable.

"In an earlier assignment with an integrator operating its own soya extraction plant, we consistently achieved SBM with just 0.5% silica. Today, sourcing from commercial extraction plants typically yields SBM with silica levels as high as 2%," Dr Pattabhirama added, noting the implications for feed efficiency and performance.

### DDGS Use and the Soybean Meal Adulteration Debate

The increasing use of DDGS



in poultry and cattle feed has added another layer to the ongoing debate around protein sourcing and soybean meal quality.

According to DN Pathak of



Soybean Processors Association of India (SOPA), the issue is often misunde

rstood and, in some cases, misrepresented.

The use of DDGS in poultry feed has drawn attention, though primarily as a limited partial replacement for soybean meal. "Inclusion is currently restricted to about 3–4%, as soybean meal cannot be fully replaced due to its superior nutritional profile and concerns around aflatoxin contamination in maize-based DDGS," he said.

Pathak rejected claims that DDGS is widely used to adulterate soybean meal, calling such allegations largely unfounded and driven by commercial pricing dynamics. He pointed out several large poultry integrators operate their own soy processing plants and are well aware that nearly 96% of soybean meal production costs are linked to raw material, leaving little scope for wide price variation.

According to Pathak, pressures to procure soybean meal below production cost, extended payment cycles, and unilateral quality testing practices often contribute to

disputes over quality.

He further noted that most processors refuse to compromise on quality and insist on fair pricing, while buyers seeking cheaper alternatives gravitate toward suppliers willing to meet those price expectations—only to later raise concerns over quality. He emphasized that these challenges can be best addressed through constructive dialogue and closer collaboration between the soy and poultry sectors to strengthen domestic supply chains and ensure fair competition, particularly as global price differentials increasingly influence import considerations.

#### Infrastructure Gaps Add to Cost Pressures

Industry leaders argue that many quality and cost challenges stem from inadequate grain infrastructure.

"India lacks public infrastructure for grain cleaning, drying, and storage,"

said Ashok Kumar of Maa Integrators. "Recent government procurement costs around INR 4,700 per tonne for collection, transport, and handling can be reduced to nearly INR 2,000 per tonne with proper material handling and drying infrastructure."

Kumar also highlighted the untapped potential of by-product utilisation in poultry



processing. "Very soon, we will be processing around 2 crore birds per day, and almost 30% is lost during processing. If this can be efficiently rendered, the waste could generate nearly 14 lakh kilograms of poultry meal daily, significantly reducing pressure on grains."

#### Dairy Sector Shifts Toward Quality and Science

In the dairy sector, experts point to a gradual but irreversible shift from volume-based to quality-linked production.



"The dairy sector is undergoing a gradual but irreversible shift

from volume-based to quality-linked production," said Amit Mittan of De Heus. "Organised milk procurement under White Revolution 2.0—combined with fat- and SNF-linked pricing—is accelerating adoption of balanced rations and feed quality systems."

Scientific feeding is already delivering measurable results. Dr Avinesh Sharma of Sunjin India Feeds cited large dairy farms in Punjab where structured feeding programs have

raised productivity significantly.

"Proper implementation of scientific feeding can increase milk yields by



15–20% in HF and crossbred cows and 8–10% in indigenous breeds,” he said, noting average yields rising from 20 to nearly 25 litres per animal by 2025.

Punjab's dairy success offers a replicable model. “The state's success is driven by 100% artificial insemination, high-quality feed and fodder—especially maize silage—and strong veterinary infrastructure,” Dr Avinesh added.

### Regional Growth Corridors Emerge

India's feed demand remains highly regionalised, shaped by species concentration and ingredient availability.

“Northern and western peri-urban milk sheds are driving demand for premium cattle nutrition solutions, while southern India remains the core poultry feed corridor,” Mittan said. Eastern and central regions, he added, represent the next phase of growth.

Several states remain underserved despite strong potential. “Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat, and the North-Eastern region lack access to advanced farm-level services, yet represent the future growth opportunity for the dairy feed industry,” Dr Avinesh noted.

### Buffalo Nutrition: An Untapped Lever

Buffalo-centric nutrition is emerging as a major opportunity.

“At Gokul, nearly half of our 18 lakh litres of daily milk come from buffalo farms,” said Dr V. D. Patil of Gokul

Milk Union. “Nutrition is the most powerful yet underutilised lever for enhancing buffalo productivity and fertility.”

Despite higher fat content in buffalo milk, compound feed penetration remains low.

“Buffaloes can digest

tougher fibre, but fibre alone is not enough to produce high-

quality milk,” Dr Patil said, pointing to the need for formulations tailored specifically to buffalo requirements.

### Poultry Industry: Discipline Restores Balance

The poultry sector saw a largely average performance in 2025, with early losses offset by improved discipline



later in the year. “Lower DOC placements, tighter control on body weights below 2.5 kg, and higher mortality collectively contributed to restoring overall profitability,” said Dr Amiya Nath, JAPFA Comfeed India.

Looking ahead, Dr Nath emphasised the role of regulation. “Regulation of DOC (Day-Old Chick) production through government intervention is critical. In the broader

livestock sector, scientific feeding of just the top 5% high-yielding cattle can significantly improve overall productivity.”

### Consolidation and the Road Ahead

Farm consolidation is gradual but visible, particularly in Punjab, Haryana, and peri-urban buffalo belts.

“Nearly 95% of cattle are still owned by smallholders, but among the remaining 5%, peri-urban farms—largely buffalo-based—are significantly larger,” noted Dr Pradeep Mahajan, dairy expert.

Fair and transparent milk pricing is

expected to be the first trigger for consolidation,

followed by stricter enforcement of quality standards.

Despite ongoing risks from climate variability, fodder stress, and disease outbreaks, the broader outlook remains steady.

“Overall, 2025 has been a positive and stable year for the dairy sector, supported by consistent demand and relatively stable farm economics,” added Dr Mahajan.

As India's feed industry navigates rising complexity, experts agree that quality, infrastructure, and scientific feeding—not volume alone—will determine the next phase of sustainable growth.



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# Maize Straw: Converting Agricultural Residue into Revenue Streams for Rural Enterprises

by <sup>1</sup>Dr. Simranjeet Kaur, <sup>1</sup>Dr. Harsimran Kaur, <sup>2</sup>Dr. Harinder Singh

<sup>1</sup> Ph.D., School of Business Studies, Punjab Agricultural University | <sup>2</sup>Excellent Enterprises, Khanna

## Introduction

India's maize sector has undergone steady expansion over the last decade, driven by rising demand from the poultry feed, starch, and ethanol industries. In 2023–24, the country produced approximately 35.7 million tonnes of maize grain (Agricultural & Processed Food Products Export

Development Authority [APEDA], 2024). The FAO forecasts India's aggregate maize production in 2024 at a record 38.1 million tonnes, driven by large sowings and strong domestic feed demand and According to the Third Advance Estimates released by India's Ministry of Agriculture & Farmers' Welfare, maize production in



the 2024–25 agricultural year is estimated at 422.81 lakh metric tonnes (LMT), which equates to 42.281 million tonnes.

Alongside this grain output comes an equally significant volume of maize straw—also known as maize stover—which includes leaves, stalks, and cobs left after harvesting. Approx 3.0–4.0 ton of straw is produced per acre.

A conservative residue-to-product ratio (RPR) for maize is close to 1:1 (U.S. Department of Energy [DOE], 2019), meaning that for every tonne of maize grain, roughly one tonne of stover is generated. This places India's potential annual maize straw output in the range of 30–35 million tonnes. While much of biomass is left to decompose or is burned in fields, organized collection and processing can transform this by-product into a high-value commodity across multiple sectors.

For Farmer Producer Organisations (FPOs), Milk Producer Companies (MPCs), cooperatives, and agri-startups, maize straw presents a scalable business opportunity that aligns with

both income diversification and sustainability goals, while also generating substantial rural employment and strengthening dry fodder security for dairy animals.

### 1. Livestock Feed: Bales, Silage, and Densified Products

#### Market Rationale

Maize straw is a critical roughage source in mixed crop–livestock systems. The International Maize and Wheat Improvement Centre (CIMMYT) has documented cases where maize stover bales sold to smallholder dairy farmers at around INR 3.8 per kilogram, undercutting the cost of sorghum stover while maintaining acceptable nutritional value (CIMMYT, 2013). Moreover, breeding programs for dual-purpose maize have increased stover digestibility, making it a viable fodder base (Rai et al.,

2021).

#### Processing Options

- **Baled Stover:** Direct field baling reduces labour dependence for farmers and ensures consistent feed supply for dairies.
- **Multi-Enzyme Treatment:** Enhances crude protein content and palatability, enabling higher feed conversion efficiency.
- **Pelletized Feed Blocks:** Compaction increases bulk density from ~94 kg/m<sup>3</sup> to ~390 kg/m<sup>3</sup>, cutting transport costs by up to 60% over typical rural haul distances (University of the Philippines Los Baños [UPLB] & International Rice Research Institute [IRRI], 2023).

#### Economics of Straw Handling

Collection and transport costs for cereal straw, including maize, typically range between INR 900–1,300 per tonne for short hauls (5–15 km) (Council on Energy, Environment and Water [CEEW], 2023). With market prices in the range of INR 3,500–5,000 per tonne, gross margins can be INR



2,000–3,900 per tonne, before financing and storage costs. In Punjab, during each maize harvest, the delivered price of baled straw ranges from INR 1500 to INR 1800 per tonne.

## 2. Renewable Energy: Bio-CNG, Biomass Pellets and Bioethanol

### Bio-CNG through SATAT

The Sustainable Alternative Towards Affordable Transportation (SATAT) initiative by India's Ministry of Petroleum & Natural Gas provides assured offtake for Compressed Bio-Gas (CBG) from agricultural residues (Ministry of Petroleum & Natural Gas [MoPNG], 2024). Additionally, lignocellulosic structure of maize straw makes it a suitable feedstock for anaerobic digestion, particularly when co-digested with animal manure.

### Biomass Co-firing

The Ministry of Power encourages biomass co-firing in thermal power plants at a blending rate of 5–10%. Pellets and briquettes produced from maize straw can meet this demand, with procurement facilitated under the SAMARTH mission (Ministry of New & Renewable Energy [MNRE], 2025).

### Second-Generation Ethanol

Research shows that maize stover can yield high levels of fermentable sugars after pretreatment, making it a suitable feedstock for second-generation ethanol plants (Menardo et al., 2013).

Cost Component	INR/Tonne
Field baling & aggregation (5-15 km)	900-1,300
Storage & handling	150-250
Total Cost	1,050-1,550
Sale Price (INR 3.5-5/kg)	3,500-5,000
Gross Margin	2,000-3,900

With India's ethanol blending program expanding, this could emerge as a niche yet profitable application.

## 3. Specialty Material Applications

### Agro-fiber Boards

Maize straw can be converted into particle boards or fiber panels for the furniture and packaging industries. MSME-scale production lines are already available, requiring modest capital investment.

### Animal Bedding

The poultry and equine sectors pay for chopped stover due to its high absorbency and cushioning qualities.

### Mushroom Cultivation

Properly pasteurized maize straw serves as an excellent substrate for mushroom production, opening a high-margin agribusiness avenue.

## 4. Operational Blueprint for Rural Enterprises

### Step 1: Residue Mapping

Identify maize-growing clusters and estimate accessible straw volumes using conservative removal rates of 33–50% to maintain soil cover (United Nations Economic and Social Commission for Asia and the Pacific [UN-ESCAP], 2023).

### Step 2: Infrastructure & Logistics

Rent or purchase balers, rakes, and loaders. Build low-cost sheds for off-season storage to prevent moisture damage.

### Step 3: Market Linkages

Sign seasonal supply agreements with local dairy cooperatives, bioenergy developers, and material processors. Include clauses for fuel price and moisture adjustments.

### Step 4: Value Addition

Invest in small-scale multi-enzyme treatment units or pelletizers to increase the per-unit value of stover sold.

### 5. Financial Snapshot

Value-added forms such as treated stover or pellets can raise prices by INR 1–1.8 per kilogram, boosting overall returns.

### Conclusion

Maize straw represents a multi-stream business opportunity that fits perfectly into the operational capabilities of FPOs, MPCs, cooperatives, and agri-startups. By focusing on aggregation, densification, and targeted offtake agreements across feed, energy, and material sectors, rural enterprises can transform an underutilized residue into a dependable, scalable income source.

*References are available on request.*



(OUR BEST SELLERS)

### MINERALS

- **ZINC SULPHATE**
- **ZINC OXIDE**
- **FERROUS SULPHATE**
- **MANGANESE SULPHATE**
- **MANGANESE OXIDE**
- **COPPER SULPHATE**
- **COBALT SULPHATE**
- **CALCIUM IODATE**
- **SODIUM SELENITE**
- **COBALT CARBONATE**

### VITAMINS

- **VITAMIN - E**
- **VITAMIN - A**
- **VITAMIN - C**
- **VITAMIN - K**
- **VITAMIN - B9**

### BULK PRODUCTS

- **DI CALCIUM PHOSPHATE (DCP)**
- **MONO CALCIUM PHOSPHATE (MCP)**
- **SODIUM BI CARBONATE (SBC)**

### AMINO ACID

- **DL-METHIONINE**
- **L-LYSINE HCL**
- **L-THREONINE**
- **L-TRYPTOPHAN**

### ANTIBIOTICS

- **ENROFLOXACIN**
- **FLORFENICOL**
- **AZITHROMYCIN**
- **CIPRFLOXACIN**
- **AMOXICILLIN**
- **VIRGINIAMYCIN 11%**
- **TIAMULIN 10, 45, 80%**
- **TYLOSIN**
- **IVERMECTIN**



# Feed Formulation Intelligence: The Invisible Driver of Milk, Fertility, and ROFC

by **Dr Manish Pathak**, Carus Laboratories



Dr Manish Pathak

In practical dairy nutrition, the statement “Dairy feed formulation is the black box of cow performance” is not a metaphor—it is a biological and economic reality. While feed bags may appear identical in crude specifications, the underlying formulation architecture determines rumen function, nutrient partitioning, metabolic health, and ultimately farm profitability.

## Why Feed Formulation Is Termed a Black Box

At the farm level, decision-making is often based on visible parameters: - Declared crude protein (CP) - Feeding rate (kg/day) - Market price per bag. However, animal responses frequently diverge: - Variable milk yield and persistency - Fluctuations in milk fat and SNF - Changes in reproductive efficiency - Altered disease incidence and metabolic disorders.

This discrepancy arises because label nutrients represent quantity, whereas formulation governs nutrient availability, utilization efficiency, and metabolic synchronization.

## Inside the Black Box: What Truly Drives Performance

### 1. Protein Nutrition: Balance Over Percentage

Crude protein concentration alone is an inadequate predictor of animal response. Two rations with identical CP can differ substantially in metabolizable protein supply due to:

- Rumen Degradable Protein (RDP) vs Rumen Undegradable Protein (RUP) balance
- Microbial protein synthesis efficiency
- Essential amino acid profile, particularly Lysine and Methionine

Inadequate RDP limits microbial growth, while excessive RDP increases

rumen ammonia, elevates blood urea nitrogen (BUN), and reduces fertility. Conversely, optimized RUP sources and rumen-protected amino acids improve milk yield, milk protein, and nitrogen-use efficiency.

CP on the label does not equate to metabolizable protein at the mammary gland.

### 2. Energy Nutrition: Quality, Fermentation Rate, and Synchrony

Energy is the primary limiting nutrient in lactation, but energy percentage alone is misleading. Critical formulation considerations include:

- Fermentation kinetics of carbohydrates (rapid vs slow fermenting)
- Non-fiber carbohydrates (NFC) vs physically effective fiber
- Starch source, particle size, and processing method

Improper synchronization between rumen-available energy and nitrogen reduces microbial protein yield, leading to poor milk response despite adequate nutrient intake. High-energy rations without adequate rumen buffering often predispose cows to sub-acute ruminal acidosis (SARA).

### 3. Mineral Nutrition: Bioavailability Dictates Biological Response

Mineral nutrition failures are frequently misdiagnosed as reproductive or health disorders. The issue often lies not in mineral quantity, but in chemical form and bioavailability.

- Inorganic mineral salts may exhibit antagonism and poor absorption
- Organic or chelated minerals demonstrate higher bioavailability and tissue retention

Trace minerals such as Zinc, Copper, Selenium, and Chromium play pivotal roles in: - Immune competence - Hoof

integrity - Ovarian function and conception rate Repeat breeding, retained placenta, and compromised immunity often originate from subclinical mineral inefficiency rather than infectious causes.

**4. Rumen Health: The Central Regulator**

The rumen is the primary interface between formulation and performance. Feed formulation directly regulates:

- Rumen pH dynamics
- Microbial population structure
- Fiber degradation efficiency

Minor imbalances in physically effective fiber, starch fermentability, or buffering capacity can result in: - Milk fat depression - Loose or foamy dung - Reduced dry matter intake - Increased feed wastage Maintaining rumen stability is essential for consistent milk composition and long-term cow longevity.

**5. Feed Additives: Efficiency Modifiers, Not Fillers**

Modern formulation leverages additives to enhance nutrient extraction rather than increase feed volume:

- Live yeast and yeast cultures: enhance fiber digestion and stabilize rumen pH
- Buffers: mitigate ruminal acidosis risk
- Exogenous enzymes: improve digestibility of fiber and starch fractions
- Rumen-protected methionine and lysine (RPM/RPL): improve amino acid balance and protein efficiency

These interventions improve

feed efficiency, milk response, and return on feed cost (ROFC) without increasing intake.

The difference lies in formulation intelligence, not feeding quantity.

**Field-Level Reality**

Milk is synthesized in the udder, but performance is programmed in the formulation.

Farmers often describe feed formulation as a black box because: - They observe outputs, not formulation logic - Small compositional changes create disproportionate responses - Biological effects manifest gradually rather than immediately

**Opening the Black Box: Practical, Performance-Based Evaluation**

For rational feed evaluation and selection:

- Assess feeds based on Return on Feed Cost (ROFC), not bag price
- Monitor milk fat, SNF, and dung consistency as early indicators of rumen health
- Track reproductive

**Same Intake, Different Outcomes: A Practical Illustration**

Parameter	Feed A	Feed B
Crude Protein (%)	18	18
Feeding Rate (kg/day)	6	6
Milk Yield (L/day)	13	15
Milk Fat (%)	3.7	4.1
ROFC (INR/day)	210	270

indices such as days open and services per conception

- Conduct structured, performance-based feeding trials rather than short-term visual assessments

**Conclusion**

Dairy feed formulation is not a static recipe but a dynamic, biologically driven system.

Understanding the interactions between protein fractions, energy synchronization, mineral bioavailability, rumen health, and additives allows nutritionists and producers to convert feed cost into sustainable profitability. The real performance driver is not what is visible on the label—but what is engineered inside the formulation.



# Key Takeaways from South Asia Poultry Nutrition Summit 2025



**B. M. Bhanderi**

The South Asia Poultry Nutrition Summit 2025, organized by Alltech, was held around the theme “Smart Nutrition for Profitable and Sustainable Poultry Production.” The three-day summit brought together over 85 senior delegates from across South Asia, including poultry nutritionists, feed millers, integrators, and industry leaders.

The event featured distinguished speakers such as Dr. Rick Kleyn, renowned global poultry nutritionist and consultant, who shared insights on aligning nutrition strategies with evolving industry realities, and Dr. Roy Brister, Strategic Poultry Advisor at Alltech, who emphasized data-driven decision-making and precision nutrition as critical tools for improving poultry performance and profitability. Think Grain Think Feed interacted with several participants to capture their key learning points and practical takeaways from the summit.

## Takeaway Messages from Industry Experts

### Optimizing Feed Processing: Particle Size, Equipment, and Quality Control

by B. M. Bhanderi, Amul Dairy

- Optimize Particle Size: Proper grinding improves digestibility, reduces waste, and enhances pellet quality. Ingredient size, shape, and density influence mixing efficiency. Ideal particle sizes: dairy cattle (300–400 microns), broiler starter (1–14 days: 900–1000 microns), grower/finisher (15–42 days: 1000–1200 microns), growing chickens (600–900 microns), and swine (500–600 microns).
- Control Process Parameters: Maintain optimal feed rate, moisture (15–18% before pelleting), temperature (180–190°F), steam quality (superheated: 5–10°C above

saturated steam), steam pressure (2.5–3.5 kg/cm<sup>2</sup>), and conditioning time (45–60 seconds) for uniform results.

- Select the Right Equipment & Maintenance: Well-maintained, correctly sized machinery reduces downtime and energy use. Proper maintenance and equipment type significantly impact mixing efficiency.
- Hammer Mill: Position, number, and condition of hammer mills, along with screen size (0.6–5 mm SS, 0.5–10 mm carbon steel) and shape, are critical for uniform grinding. Use of VFDs can further improve process efficiency.
- Energy Efficiency: Monitor and minimize power consumption without compromising feed quality. Ideal power consumption is 16–21 KW/h/MT.
- Quality Assurance: Regular testing of incoming raw materials ensures nutritional accuracy and compliance with feed regulatory standards. High ingredient quality ensures high feed quality. Maintain optimum PDI (~97%) and minimal fines (~1.5%) in final products.
- Coefficient of Variation (CV): CV in feed mixing is a key metric for nutrient uniformity. CV <10% = excellent, 10–15% = good, >20% = poor mixing.
- Continuous Improvement: Use data monitoring and plant automation to fine-tune processes over time.

### Optimizing Poultry Nutrition: Protein, Amino Acids, and Cost-Effective Feeding Strategies

by Dr. Pattabhirama, Nanda Group

- In broiler breeder nutrition, while corn–soy diets remain standard, properly ground mash feed is sufficient, and pelleting does not offer significant performance



**Dr. Pattabhirama**



**Dr. Dinesh Gautam**

advantages—presenting a clear opportunity for cost savings.

- For broilers, lower crude protein diets can perform well when amino acids are balanced, but in fast-growing strains, especially during the pre-starter and starter phases, protein levels cannot be compromised. Birds respond better to slightly lower energy diets than to protein restriction.
- Meat quality is directly linked to higher amino acid density in the diet, improving yield.
- In layers, despite breeder recommendations of 17–18% protein, birds can

perform efficiently on around 15% dietary protein, provided amino acid balance is optimized.

**Optimizing Layer Management: Nutrition, Pellet Size, and Extended Production**

by Dr. Dinesh Gautam, Poultry Nutritionist, Nepal

- The feasibility of extended layer production cycles up to 100 weeks was highlighted, emphasizing the role of precise nutrition and management.
- The use of 4–5 mm pellets in the US, compared to the current ~3 mm standard in

Nepal, represents a significant cost-saving opportunity. This approach could be adopted gradually after carefully designed field trials.

**Concluding Remarks**

The South Asia Poultry Nutrition Summit 2025 reinforced that smart nutrition goes hand in hand with smart feed processing. By combining precision nutrition, data-driven decisions, and efficient feed milling practices, the poultry sector can achieve higher productivity, lower costs, and sustainable growth in the years ahead.



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## India's Oilmeal Exports Decline in December on Weak Soybean Meal Demand

India's oilmeal exports dropped sharply by 40% year-on-year in December to 2.40 lakh tonnes, compared with 3.98 lakh tonnes in the same month last year, mainly due to a steep fall in soybean meal shipments, according to the Solvent Extractors Association of India (SEA). Soybean meal exports plunged to 1.14 lakh tonnes from 2.78 lakh tonnes a year earlier, reflecting weak price competitiveness despite some support from European buyers.

Exports of other oilmeals also declined during the month. Rapeseed meal shipments fell to 71,452 tonnes from 88,746 tonnes, castorseed meal exports dropped to 21,904 tonnes from 28,452 tonnes, and groundnut meal exports decreased to 1,609 tonnes from 3,050 tonnes. In contrast, rice bran extraction exports surged sharply to 31,237 tonnes from just 70 tonnes a year earlier, providing limited support to overall volumes.

For the April–December period of the current financial year, India's total oilmeal exports declined 6% to 29.75 lakh tonnes, down from 31.50 lakh tonnes a year ago. SEA attributed the subdued trend to multiple factors, including reduced rapeseed crushing in India and a recent rise in global prices, which is expected to curb Chinese demand for Indian rapeseed meal.

Domestically, soybean meal demand has remained weak as livestock feed makers increasingly prefer cheaper distillers dried grains with solubles (DDGS). Major importers of Indian oilmeals include China, South Korea, Bangladesh and Germany.

## Punjab to Pilot Hybrid Maize Seed Production in Spring Season

After a successful breakthrough in hybrid maize seed production, the Indian Institute of Maize Research (IIMR) is set to conduct trials for commercial seed cultivation in Punjab during the spring season beginning in February. The initiative follows field experiments carried out since 2023, which confirmed that Punjab's soil and climatic conditions are suitable for producing hybrid maize seeds.

IIMR director Hanuman Sahay Jat said that nearly 95% of India's hybrid maize seeds are currently produced in Andhra Pradesh and Telangana, leading to higher costs due to long-distance transportation. Localised seed production in Punjab,

he said, would reduce costs, promote maize cultivation, and help farmers improve their incomes.

Senior maize breeder Bhupender Kumar said a key field trial was conducted during the late kharif season in August in Moga district, where hybrid maize variety DMRH 1308 was sown on a farmer's field. Prior to this, the same hybrid was tested for two consecutive kharif seasons at IIMR's Ludhiana farm. Three years of trials at both institutional and farmers' fields established that hybrid maize seed production is feasible in Punjab.

Kumar noted that seeds harvested during late kharif can be directly used for spring maize cultivation after potato harvesting, avoiding long-term storage and associated expenses. Farmers, especially potato growers, are now being identified for limited spring trials focused strictly on seed production.

Currently, Punjab depends entirely on southern states for hybrid maize seeds, which cost around INR 1,000 per kg during peak season. In contrast, local seed production and processing costs are estimated at INR 50–60 per kg, indicating significant potential savings. Progressive farmers say the initiative aligns with government goals of crop diversification and expanding maize cultivation for biofuel, while ensuring affordable, quality seeds for the state.

## Farmers Caution Centre Against Opening New Shrimp Import Routes

Shrimp farmers across Andhra Pradesh have urged the Central government to retain the existing restrictions on importing specific pathogen-free (SPF) shrimp broodstock from South East Asian countries, expressing concerns over the possible entry of new diseases into India. Their appeal comes amid indications that the Centre may review the ban imposed in 2013 following outbreaks of early mortality syndrome (EMS) and acute hepatopancreatic necrosis syndrome (AHPNS) in several South East Asian nations.

Currently, India imports SPF broodstock mainly from the Hawaii Islands in the United States, and occasionally from Ecuador and Madagascar. All imports undergo stringent disease screening at the Aquatic Quarantine Facility (AQF) in Chennai to ensure they are free from listed pathogens. Farmers argue that allowing imports from countries such as Thailand, China, Vietnam and Malaysia could expose Indian shrimp farming to unknown pathogens that domestic testing systems may not be able to detect in time.

Prakasam District Prawn Farmers Association president D. Gopinadh said the existing restrictions had protected Indian

farmers from heavy losses. He warned that testing mechanisms are designed to detect only known diseases and recalled the severe impact of *Enterocytozoon hepatopenaei* (EHP) when it first emerged. He noted that Andhra Pradesh contributes more than 70% of India's shrimp production, supporting thousands of farmers and lakhs of people engaged in allied activities such as feed supply, transport and processing. Any major disease outbreak, he said, could severely affect the state's economy.

However, scientists and fisheries officials have dismissed these concerns. B. Madhusudana Rao, principal scientist at ICAR–Central Institute of Fisheries Technology, Visakhapatnam, said the AQF in Chennai is fully equipped to detect shrimp diseases. Officials added that ICAR–Central Institute of Brackishwater Aquaculture (CIBA), along with several central and state agencies, actively monitors and safeguards the shrimp ecosystem in the country.

## China Likely to Rely More on Brazilian Soybeans in Early 2026 as Price Gap Widens

China is expected to increase imports of Brazilian soybeans in the first half of 2026, driven by record South American production and more competitive prices, despite a resumption of U.S. soybean shipments. Trade sources said Chinese private crushers are actively securing Brazilian cargoes from February onwards as harvesting accelerates, boosting supplies and pressuring prices.

Brazil's pricing advantage is expected to curb demand for U.S. soybeans when the American export season begins in September. While China has purchased around 12 million tonnes of U.S. soybeans since late October following an improvement in bilateral ties, these deals were made entirely by state-owned firms Sinograin and COFCO. Higher U.S. prices and a 13% Chinese tariff continue to discourage private buyers, compared with a 3% duty on Brazilian supplies.

Analysts noted that current U.S. purchases are largely political, aimed at maintaining a positive atmosphere ahead of a possible April meeting between Chinese and U.S. leaders. Even if Beijing directs state firms to buy more U.S. soybeans to meet trade commitments, volumes are likely to remain limited unless tariffs are reduced.

Crush margins for Brazilian soybeans shipped between March and June remain attractive, supporting expectations of higher exports to China than last year. Brazilian soybeans are currently cheaper than U.S. Gulf and Pacific Northwest supplies, with China having paid significantly more for U.S. cargoes at recent price levels.

With bumper soybean crops forecast in Brazil and Argentina, traders expect South American supplies to dominate until new U.S. soybeans arrive in September. Brazil's 2025/26 production is projected at a record 182.2 million tonnes, with exports to China estimated to rise to about 85 million tonnes. Strong soymeal demand, supported by China's large pig herd, is expected to underpin imports in the first half of 2026.

## Tariff-Hit Indian Shrimp Finds Relief in Chinese Market

India's shrimp exports to China have risen sharply in 2025, offering crucial relief to exporters facing steep tariffs of up to 58% in the United States. Commerce ministry data show that China has emerged as a fast-growing alternative market, particularly after the U.S. imposed additional duties on Indian imports in late August, prompting exporters to accelerate market diversification.

Marine product exports to China grew by an exceptional 1,307% during April–October, with shrimp accounting for a major share of this surge. During April–November, marine exports to China touched USD 1.05 billion, supported by consistently strong frozen shrimp shipments. Between August and October 2025, monthly frozen shrimp exports ranged from USD 40 million to USD 55 million, reflecting sustained demand from Chinese buyers following the tariff shock in the U.S. market.

Within shrimp categories, black tiger shrimp exports increased by USD 92.6 million during April–October compared with the previous year, while vannamei shrimp exports were higher by USD 56.8 million. The timing of the growth suggests a clear shift in trade flows after August-end, when higher U.S. duties began to weigh on India's competitiveness in its largest traditional export market.

Exporters and officials say the strong and steady shipment pattern indicates that China is not merely absorbing one-off consignments but is emerging as a structurally important destination for Indian shrimp. With China alone contributing significantly to India's export growth in recent months, the market is helping cushion the impact of U.S. trade barriers and providing Indian shrimp farmers and processors with a critical outlet for their produce.

## Smart Tags and AI to Predict Animal Illness Under GADVASU Research Project

Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) has partnered with the National Institute of Technology (NIT), Rourkela to develop advanced technology

capable of predicting livestock illness before visible symptoms emerge. The collaboration is part of a large research initiative supported by the Partnerships for Accelerated Innovation and Research (PAIR) programme of the Anusandhan National Research Foundation (ANRF), under which more than INR 90 crore has been sanctioned. According to the university, the project aims to strengthen early-warning systems for livestock health, enabling farmers to take preventive measures in advance, thereby reducing economic losses and improving animal welfare. GADVASU will receive INR 4.08 crore from the total INR 90.53 crore PAIR-ANRF outlay.

Principal investigator Devendra Pathak said the research spans three major areas, with a key focus on machine learning-enabled systems for monitoring livestock health, optimising production, and improving sustainability. Under this component, NIT Rourkela will design wearable devices such as electronic tags that can be attached to animals to record behavioural and physiological parameters. GADVASU will provide extensive livestock data to help develop artificial intelligence algorithms capable of analysing movement patterns, rumination duration and other indicators. The system is designed to generate alerts before physical signs of disease appear, allowing timely intervention.

The broader project also includes research on improving protein functional properties using non-thermal techniques for novel food products, as well as the development of biodegradable biomaterials for healthcare applications, aligning with sustainability goals.

The initiative will operate through a hub-and-spoke model, with NIT Rourkela as the hub and several universities in Odisha participating as partners. GADVASU officials said the grant marks a major milestone in strengthening the university's translational research capabilities and contribution to national development in animal health, food innovation and sustainable technologies.

## Brazil Set for Record 177 Million Tonnes of Soybeans in 2025-26 Cycle

Brazil is on track to achieve a record soybean harvest in the 2025-26 season, with production projected to reach 177 million tonnes, according to the Brazil Agribusiness Outlook 2026 by RaboResearch. This follows a 2% increase in planted acreage compared with the previous cycle, supported by above-average planting conditions and operational progress. While this growth is below the 15-year average expansion of 4% per year, it reflects steady momentum despite high interest rates pressuring farmers' cash flow.

Brazilian soybean exports are expected to maintain record volumes, estimated at 111 million tonnes, remaining competitive against U.S. supplies despite the recent US-China trade agreement. Any shortfall in U.S. export volumes could further benefit Brazil's market share. Soybean processing is also forecast to rise by 2 million tonnes to 60 million tonnes, driven by the planned increase in the mandatory biodiesel blend to 16%, though regulatory uncertainties may limit growth.

RaboResearch noted that global market fundamentals, including expanded Brazilian acreage and stock rebuilding, are likely to keep soybean prices subdued, helping maintain low feed costs for animal protein production. The 2024-25 season had already set records in area, yield, and exports, laying the foundation for the expected 2025-26 production surge.

## India's Dairy Sector Embraces Digital Tech to Boost Efficiency and Farmer Welfare

India's dairy sector, the world's largest milk producer contributing 25% of global output, is undergoing a significant digital transformation aimed at improving productivity, transparency, and farmer welfare. The government highlighted that over 17.3 lakh milk producers and 35.68 crore animals are now integrated into e-platforms, marking a major shift toward technology-driven dairy management.

Led by the National Dairy Development Board (NDDB), the digital initiatives connect farmers, cooperatives, and stakeholders through integrated platforms that enhance operational efficiency and ensure transparent payments. The Automatic Milk Collection System, adopted across 54 milk unions, enables timely settlements and reduces inefficiencies. Similarly, the Internet-based Dairy Information System, used by 198 milk unions and 15 federations, supports data-driven decision-making and performance benchmarking.

Other digital interventions include milk route optimisation using GIS technology, which helps reduce transportation costs and improve delivery efficiency. Central to this transformation is the National Digital Livestock Mission, implemented under the "Bharat Pashudhan" platform, which aims to create a unified digital livestock ecosystem.

Officials say these efforts are modernising operations, enhancing traceability, and integrating millions of small and marginal dairy farmers into a technology-enabled ecosystem, thereby strengthening India's dairy value chain and supporting sustainable growth in the sector.

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