RNI No.: HARENG/2020/88751 POSTAL NO. PKL-259/2024-2026 Price: INR 150

dairy dimension

Volume 1 | Issue 5 | July-Aug 2025 bi-monthly

SCIENCE + TECHNOLOGY + D

GST RESET

A Defining Moment for India's Dairy Sector

Ravin Saluja

"Transformation Begins With One Farmer At a Time"

Fast vs. Slow Proteins: Unlocking the Digestive Secrets of Casein and Whey

PLUS

Maharashtra's Dairy Sector: Tradition, Transformation, and the Road Ahead

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Publisher & Editor
Prachi Arora
prachi.a@benisonmedia.com

Managing Editor
Prashant Tripathi
prashant@jordbrukare.com

Content Manager
Hema Singh
discover@dairydimension.com

Advertisement Manager
Gaurav Chander
g.chander@benisonmedia.com

Subscription Manager
Shakti Thakur
s.thakur@benisonmedia.com

Designing & Marketing Head
Ashwani Verma
info@benisonmedia.com

Published by
BENISON Media
SCO-17, 2nd Floor, Mugal Canal,
Karnal-132001, Haryana
+91 184 4047817

In association with
JORDBRUKARE
Gutenbergstrasse Kiel, 24118,
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SUBSCRIPTION INFORMATION

		Simple Post	Courier	Overseas
One Year	:	INR 1200	INR 1800	USD 300
Three Year	:	INR 3300	INR 4800	USD 900
Five Year	:	INR 5200	INR 6500	USD 1500

Printed by: Noni Printer | Published by: Prachi Arora | On behalf of: BENISON Media | Printed at: Model Town, Karnal-132001, Haryana | Published at: SCO-17, 2nd Floor, Mugal Canal Market, Karnal-132001, Haryana | Editor: Prachi Arora

GST Reset: A Defining Moment for India's Dairy Sector

A Structural Shift in Taxation

On 3 September 2025, the Goods and Services Tax (GST) Council ushered in a landmark reform for India's food and dairy industry. The new structure rationalises the earlier four-tier system into a streamlined two-slab regime, with essentials largely brought under nil or 5% GST. For dairy, the impact is immediate and far-reaching:

- Paneer (pre-packaged) and UHT milk are now exempt (0%).
- Ghee, butter, butter oil, and cheese have moved from 12% to 5%.
- Other value-added dairy categories such as ice cream have also been reduced to 5%.

This reset is more than a tax cut; it is a recalibration of affordability, competitiveness, and sectoral formalisation.

Affordability and Consumer Access

For the average Indian household, dairy staples are non-negotiable. Even a 5–7% price reduction changes purchasing behaviour. The zero-rating of paneer and UHT milk, and the halving of GST on ghee and butter, will ease monthly grocery bills across income groups.

Mrs. Bhuvaneswari Nara, Vice Chairperson and Managing Director of Heritage Foods, noted:

"These essentials touch nearly 100% of Indian households. The reforms not only lighten the monthly grocery bill but also allow branded products to compete more effectively with unorganised players. Heritage Foods will pass on the full benefit to consumers and scale capacity to capture the expected market expansion."

Such measures directly address the protein and nutrition gap in India, making high-quality dairy more accessible to families that had previously cut back or substituted with inferior alternatives due to cost pressures.

Rural Multiplier Effect

The most profound growth is likely to occur in semi-urban and rural India, where dairy consumption is deeply embedded in diets but constrained by price sensitivity. A few rupees saved per litre or per packet can unlock substantial incremental demand.

Devendra Shah, Chairman of Parag Milk Foods, emphasised the dual benefit:

"This move makes commonly consumed items more affordable in price-sensitive areas, while also giving farmers better income stability and the confidence to invest in cattle care and feed. Over time, this uplift translates into a better quality of life for dairy farming families."

With over 80 million dairy farmer households engaged in production, even a modest rise in branded consumption strengthens procurement networks, ensures offtake, and underpins farmer livelihoods.

Formalisation and Supply Chain Gains

India's dairy sector has long operated in two parallel streams: a vast informal supply chain with low compliance but attractive pricing, and a formal branded market competing under higher tax and regulatory costs. The GST rationalisation narrows this gap, creating an inflection point for formalisation.

Deepak Jolly, Chairperson of the Indian Food & Beverage Association (IFBA), framed the change as:

"A watershed moment that simplifies compliance, expands affordability, and encourages innovation across the food and beverage sector."

By levelling the field, the reforms are expected to:

- Draw more consumers into the formal sector, improving food safety and trust.
- Reduce incentives for tax evasion and adulteration.
- Encourage investment in distribution, cold chain, and farmer extension services.

For processors, the shift also means scale economics: higher volumes across paneer, ghee, and butter allow tighter integration of procurement, logistics, and retail distribution, further lowering costs.

Strategic Implications for Dairy Businesses

The tax relief provides headroom for companies to reinvest in capacity, innovation, and farmer development. Heritage Foods has already confirmed capacity ramp-ups, while others such as Parag Milk Foods are focusing on strengthening farmer linkages. Dairy boards and cooperatives are expected to leverage lower tax incidence to expand branded portfolios and upgrade infrastructure such as chilling centres and packaging lines.

Crucially, these reforms arrive ahead of the festive season – traditionally a peak period for ghee, paneer, and sweet-making ingredients. For organised players, this is an opportunity to consolidate market share from the fragmented unorganised sector.

Outlook: Towards Inclusive Growth

The GST reset should be seen as more than fiscal policy. It is a lever for:

- Nutritional security – improving access to protein and calcium across socio-economic strata.
- Farmer empowerment – generating stable demand and incentivising better productivity.
- Formalisation – narrowing the grey market and strengthening consumer trust in quality.
- Sector expansion – unlocking higher volume growth, which analysts expect to outpace the broader FMCG market in the medium term.

India's dairy economy, valued at nearly INR 19 trillion, is entering a new cycle of affordability-driven growth. For consumers, it means more milk, paneer, ghee, and butter at fairer prices. For farmers, it offers stability and reinvestment in productivity. For businesses, it represents a structural advantage in building stronger brands and supply chains.

The new GST regime is therefore not just a tax reform – it is a catalyst for the next phase of India's dairy ascendancy, where affordability, quality, and inclusivity converge to reshape both demand and supply.


Image Source: paleogrubs.com

Fast vs. Slow Proteins: Unlocking the Digestive Secrets of Casein and Whey

by **Swati Sangolgi & Sundram Singh,**
Master's (Animal Biochemistry), ICAR-National Dairy Research Institute, Karnal


Swati Sangolgi

Abstract

Milk's two main proteins—whey and casein—share the same origin but follow very different digestive paths. Whey is fast-acting: quickly absorbed, rapidly raising blood amino acid levels and triggering muscle growth. Casein, by contrast, digests slowly. It forms a gel in the stomach, releasing amino acids steadily over hours. These differences impact more than just athletic recovery—they affect satiety, energy release, and how proteins should be timed in meals and products.

In this article, we explore how whey and casein behave in the digestive system, and share science-backed strategies to make casein digest faster—such as hydrolysis, using sodium caseinate, choosing low-fat liquid carriers, and applying specific processing techniques.

Introduction: Why Speed Matters in Protein Digestion

If you've ever had a whey shake after a workout and felt a quick energy lift—or eaten cottage cheese at night and stayed full until morning—you've experienced the "fast vs. slow" protein effect.

Whey protein digests quickly, ideal for muscle repair right after training. Casein digests more slowly, steadily delivering amino acids over time. That makes it better for overnight recovery or keeping hunger at bay during long gaps between meals.

The reason? It's all in how these proteins behave in the stomach. Casein forms a gel that slows gastric emptying. Whey stays liquid and passes through quickly (Figure 1). These digestion profiles have been studied since the 1990s and still influence how dairy proteins are used in nutrition today.

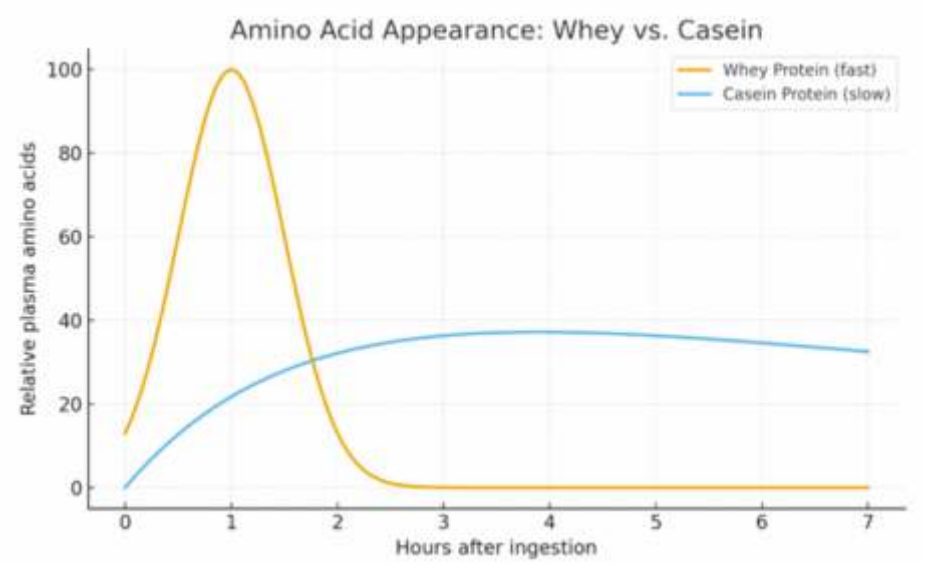
Understanding Fast vs. Slow Proteins

The concept originates from Boirieet al. (1997), who compared blood amino acid levels after consuming whey vs. casein. They found:

- Whey: Amino acids peak quickly, promoting fast muscle protein synthesis.
- Casein: Amino acids rise more slowly but stay elevated longer, helping prevent muscle breakdown.

Why Casein is Slow: Clotting, Form, and Fat

Figure 1. Plasma amino acid response after whey (fast spike) and casein (slow plateau) intake. Adapted from the classic fast-slow protein model (Boirieet al., 1997).



Casein digests slowly mainly because of gastric clotting. In the acidic stomach, micellar casein forms a soft gel, which delays gastric emptying and stretches out the release of amino acids.

Formulation matters:

- Micellar casein (naturally occurring in milk) clots more
- Sodium caseinate, which is more soluble and digests faster.

Fat content and food structure also play a role. Solid or high-fat products like cheese digest more slowly than low-fat liquids. For instance, casein in milk or shakes digests faster than in yogurt or cheese.

How to Make Casein Act Faster: Practical Strategies

1. Hydrolyzed Casein (Pre-digested)

Enzymatically breaking down casein into peptides speeds up absorption. Hydrolyzed casein behaves much more like whey, triggering a faster amino acid rise and stronger satiety response (Bendtsen et al., 2014). Commercial hydrolyzed powders are widely available.

2. Sodium Caseinate vs. Micellar Casein

Sodium caseinate is more soluble and less likely to clot.

Table 1: Key Differences Between Whey and Casein Proteins

Feature	Whey (Fast)	Casein (Slow)
Digestion Speed	20-40 min	6-7 hours
Amino Acid Response	Sharp spike	Steady plateau
Satiety	Short-term	Long-lasting
Best use	Post-workout	Bedtime/long fasting

It empties from the stomach faster and delivers amino acids sooner than micellar casein. Studies show it may also affect appetite regulation differently (Trommelenet al., 2020; Guerin et al., 2025).

3. Use Low-Fat, Liquid Formats

Fat slows stomach emptying. A low-fat drink containing casein digests faster than cheese, puddings, or other solid dairy. Liquids also form weaker gastric gels, allowing quicker protein transit (Loveday & Holroyd, 2023).

4. Blend with Whey

Combining whey and casein provides a quick amino acid spike from whey, and sustained release from casein. While it doesn't speed casein digestion itself, it improves early amino acid availability in the mix.

5. Processing Innovations

Techniques like heat treatment, homogenization, or pH adjustment can reduce gastric clotting and enhance casein solubility. Many ready-to-drink casein beverages use these methods for better absorption (Horstman et al., 2023).

What About Fermented Dairy and Enzyme?

Fermented products like yogurt and kefir begin breaking down casein thanks to microbes, increasing small peptides and amino acid content. But these products are

also thick and slow to empty, which can cancel out the faster absorption.

Enzyme supplements (like bromelain or papain) haven't consistently shown benefits in human trials for speeding up casein digestion. The most reliable way to modify casein kinetics remains hydrolysis and smart product formulation.

Appetite and Satiety: Fast vs. Sustained Fullness

Fast proteins like whey or hydrolyzed casein tend to increase short-term satiety, especially within 1–3 hours. Casein's effects emerge more slowly, but last longer—up to 5 hours post-consumption.

Product form also matters:

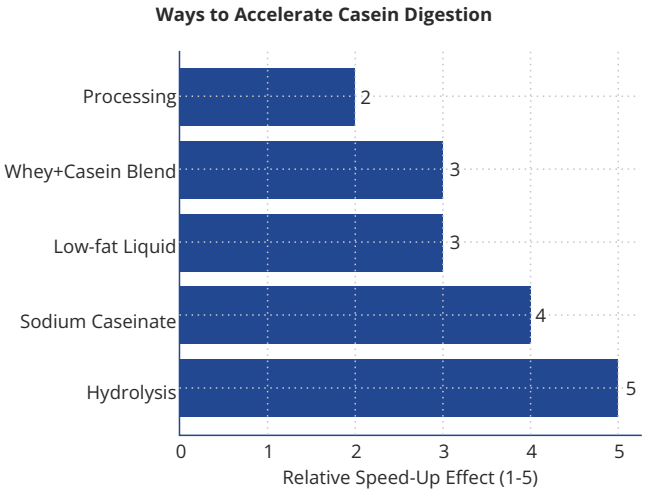
- Liquids (e.g. caseinate beverages) produce faster satiety signals.
- Solids (e.g. cheese, micellar casein powders) are better for sustained fullness.
- Practical takeaway:
- Want quick appetite control? Choose whey or hydrolyzed casein in a drink.
- Want to stay full for hours? Go with micellar casein or solid dairy.

Conclusion: Matching Protein to Purpose

The fast–slow protein concept is more than academic—it's a useful tool for real-world nutrition planning.

- Whey is ideal after workouts for quick repair and early satiety.
- Casein supports overnight recovery and long-lasting fullness.

Figure 3: Strategies to accelerate casein digestion—hydrolysis, sodium caseinate, low-fat liquids, blending, and processing.



And thanks to modern processing, “slow” casein doesn't have to stay slow. Through hydrolysis, ingredient choice, and smart formulation, it can deliver faster when needed.

Bottom line: Match the protein type and form to your goal—whether it's recovery, appetite control, or a balanced delivery of both.

References are available upon request.

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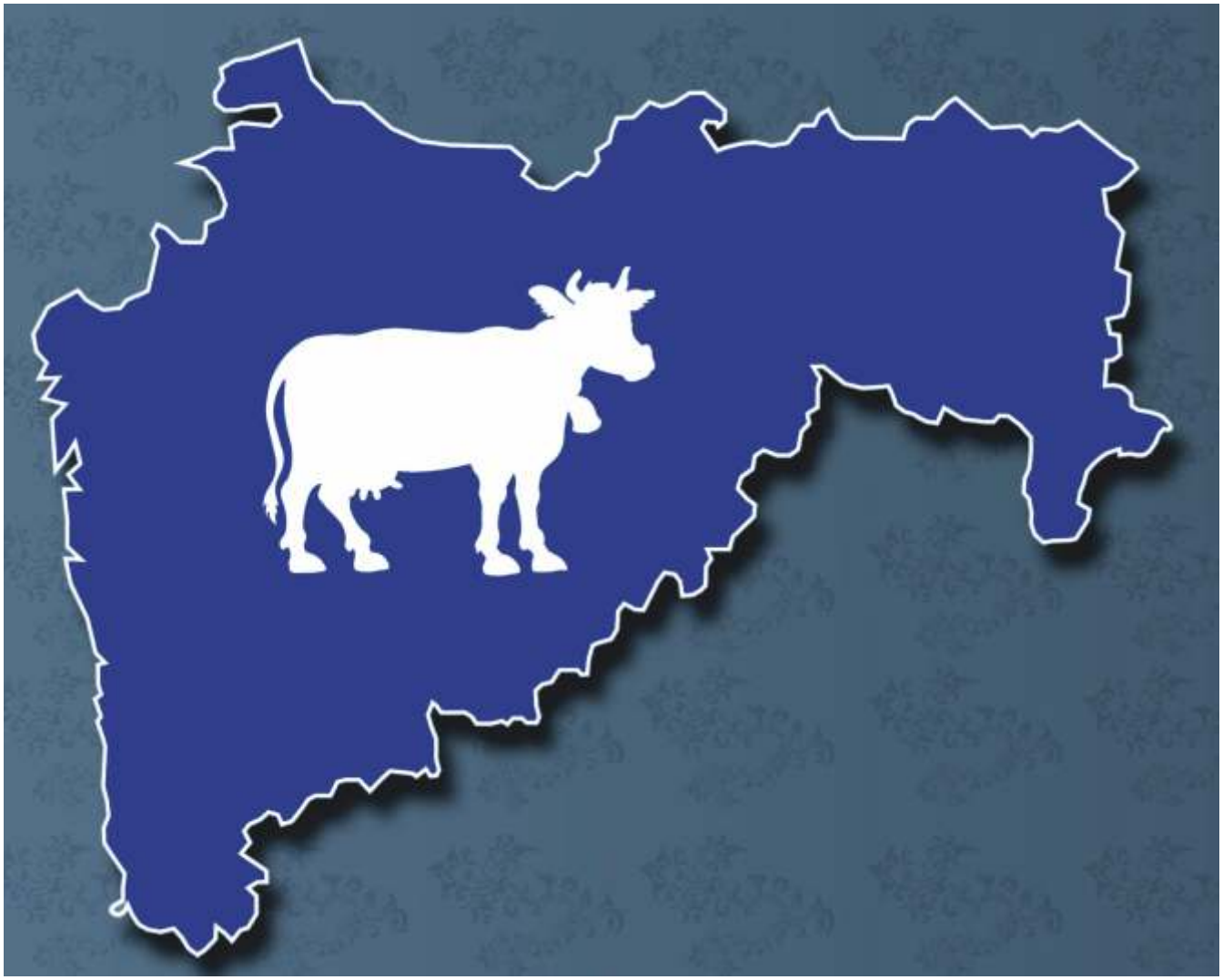


Maharashtra's Dairy Sector: Tradition, Transformation, and the Road Ahead

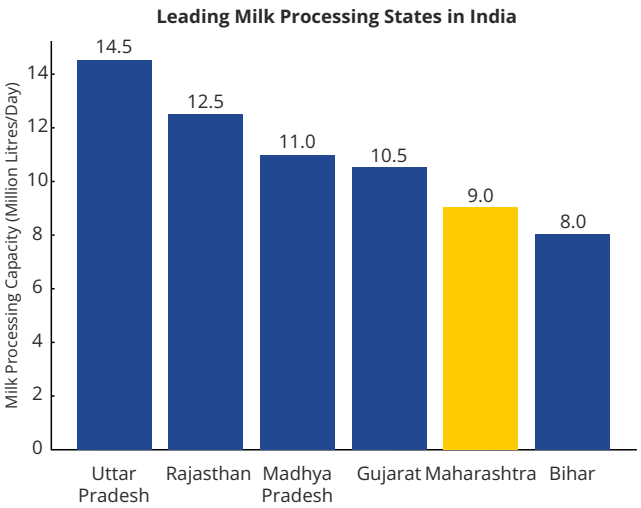
by **DAIRY DIMENSION**

A State at the Heart of India's Dairy Economy

Maharashtra, often celebrated as India's sugar bowl, is equally a powerhouse in dairy. Contributing over 16 million tonnes of milk annually, the state accounts for around 6–7% of India's total milk production. From the bustling markets of Mumbai and Pune to the drought-prone districts of Marathwada,milk is more than a staple—it's a lifeline.

The state's dairy architecture rests on a dual foundation: farmer-owned cooperatives on one side, and dynamic private players on the other. Together, they form a supply chain that links millions of smallholder farmers with urban consumers. Each dawn, tankers of chilled milk travel from rural chilling centres to processing plants, before arriving at city doorsteps in the form of milk, ghee, curd, paneer, and increasingly, value-added products.

Yet, this success is not without its challenges. Seasonal swings, erratic monsoons, and fodder scarcity frequently test the resilience of Maharashtra's dairies. Flush



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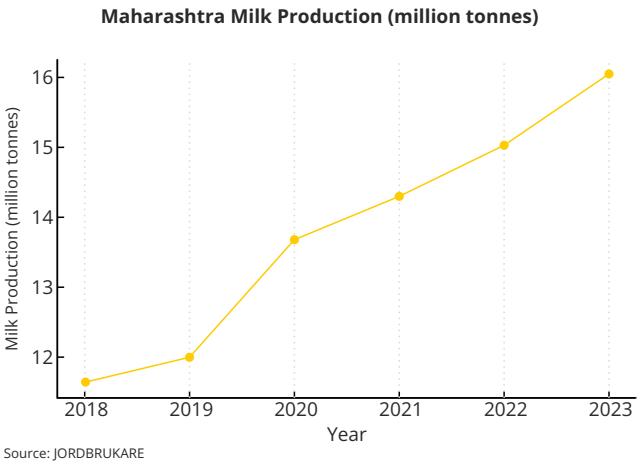


Source: JORDBRUKARE

seasons (September–March) bring surpluses, while lean summers strain supply. The intensifying impact of climate change—drought one year, floods the next—demands a forward-looking approach to procurement, feed security, and processing infrastructure.

It is against this backdrop that three institutions—Gokul, Chitale, and Sonai—demonstrate how different models, grounded in cooperativism, technology, and industrial scale, are navigating Maharashtra's dairy transformation. The following story presents insights from one-on-one interactions with three industry leaders, each offering a unique perspective.

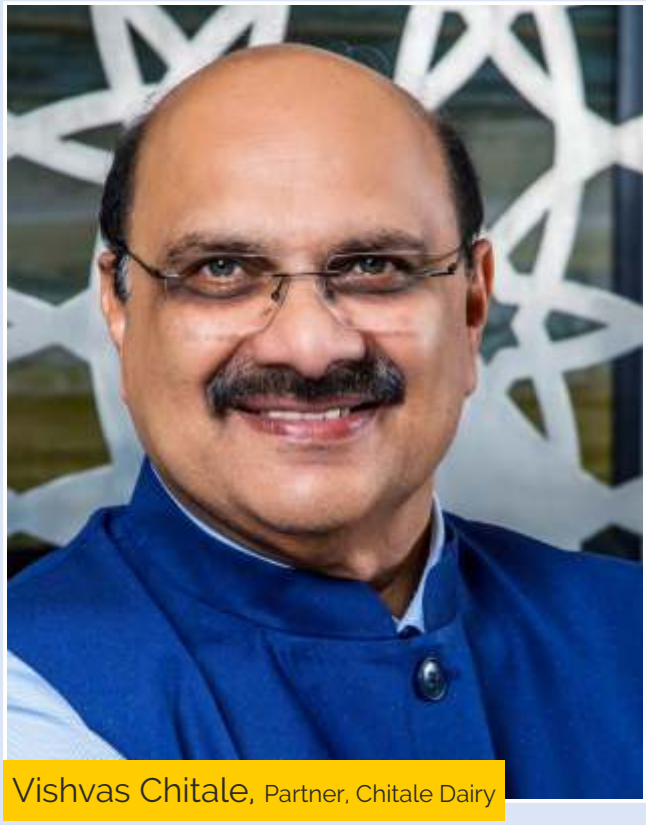
Gokul (Kolhapur District Cooperative Milk Producers Union Ltd): A Cooperative that Built Rural Resilience

Founded in 1963, Gokul has become a hallmark of cooperative strength in western Maharashtra. Today, it handles an average of 1.6 million litres of milk daily, scaling up to 1.8 million litres in the flush season. Through a network of 7,000+ village societies, Gokul serves over 500,000 farmers and commands an impressive 86% market share in the Kolhapur district, supplying 1.3 million litres daily to Mumbai and Pune.

But Gokul is more than a supplier; it is a lifeline. Over 80% of its revenues flow back to farmers, an efficiency unmatched by most cooperatives. Mobile veterinary clinics, artificial insemination centres, feed plants, and calf-rearing schemes create an ecosystem where farmers can rely on steady support.

Notably, Gokul has pioneered climate-smart practices, including Maharashtra's first fodder bank, over 7,000 biogas units, reducing per-unit installation costs from INR 43,000 to INR 5,000 with subsidies, and runs a 6.5 MW solar power plant that powers operations. Its product portfolio balances staples with tradition, ghee, butter, dahi, paneer, shrikhand, and the iconic Kolhapuri pedha. With an annual turnover nearing INR 40 billion (~USD 480 million), Gokul exemplifies what's possible when professional management meets farmer-first governance.

Yogesh Godbole, MD, Gokul



Vishvas Chitale, Partner, Chitale Dairy

Chitale Dairy (Sangli): Technology at the Service of Farmers

If Gokul represents cooperative strength, Chitale Dairy is a story of private innovation. Founded by visionary entrepreneur Bhausaheb Chitaleover seven decades ago, Chitale has built its reputation on science and digitisation.

Since 2015, over 50,000 animals in its network have been fitted with RFID collars, which feed data into a cloud platform that tracks their health, productivity, and breeding. Farmers receive SMS alerts on animal health, while supply chain orders are managed digitally, ensuring traceability "from cow to cloud."

A strategic partnership with ABS Genus has turned Chitale into one of Asia's most advanced buffalo breeding centres, producing 50 million doses of high-quality semen annually. Productivity has soared: households once producing 2–3 litres per day now reach 8–10 litres, and herd sizes have grown from 4–5 to 10–20 animals per farm.

Beyond the farm, Chitale has embraced consumer innovation. During the COVID-19 pandemic, it swiftly rolled out a home delivery app, leveraging its IT backbone to keep milk flowing in Pune and Mumbai. Its product range, including milk, ghee, butter, paneer, cheese, shrikhand, and SMP, remains synonymous with premium quality.

Chitale proves that data-driven agriculture, genetic advancement, and farmer empowerment can coexist—delivering productivity without ecological strain.

Comparative Snapshot

Dairy (Location)	Structure	Daily Milk Handling	Farmer Network	Technological Highlights
Gokul (Kolhapur)	Cooperative	~1.6 million L/day	500,000+ farmers via 7,500 societies	Veterinary network, fodder bank, solar & biogas
Chitale (Sangli)	Private	~1 million L/day	50,000+ farmers, 2 lakh+ cattle tracked	RFID collars, cloud data, genetics lab (ABS JV)
Sonai (Indapur)	Private	~3.5 million L/day	500,000+ farmers	Automated mega-plant, casein & whey processing, export orientation

Sonai Dairy (Indapur): Industrial Scale Meets Farmer Trust

If Gokul reflects the power of cooperatives and Chitale the edge of technology, Sonai Dairy represents Maharashtra's industrial leap in dairying.

From a modest 12,000 litres two decades ago, Sonai now processes ~5 million litres of milk per day at a single Indapur site — the largest such private facility in India. Daily outputs include:

- 300 tonnes of SMP
- 150 tonnes of butter
- 60 tonnes of ghee
- 250,000 litres of pouch and UHT milk

Sonai's strength lies in scale, diversification, and export readiness.By investing in advanced spray dryers, cheese units, and whey protein plants, it's tapping into global dairy demand. Casein, lactose, and whey proteins are now part of its export basket, with markets in North America, the Middle East, and Asia-Pacific.

Equally, Sonai has remained farmer-centric. Over 500,000 farmers, both directly and indirectly, benefit from timely payments, feed access, and veterinary care. Its success has turned Indapur into a rural industrial hub, spurring jobs in logistics, packaging, and allied sectors.

Dashrath S. Mane, Chairman & MD, Sonai Dairy

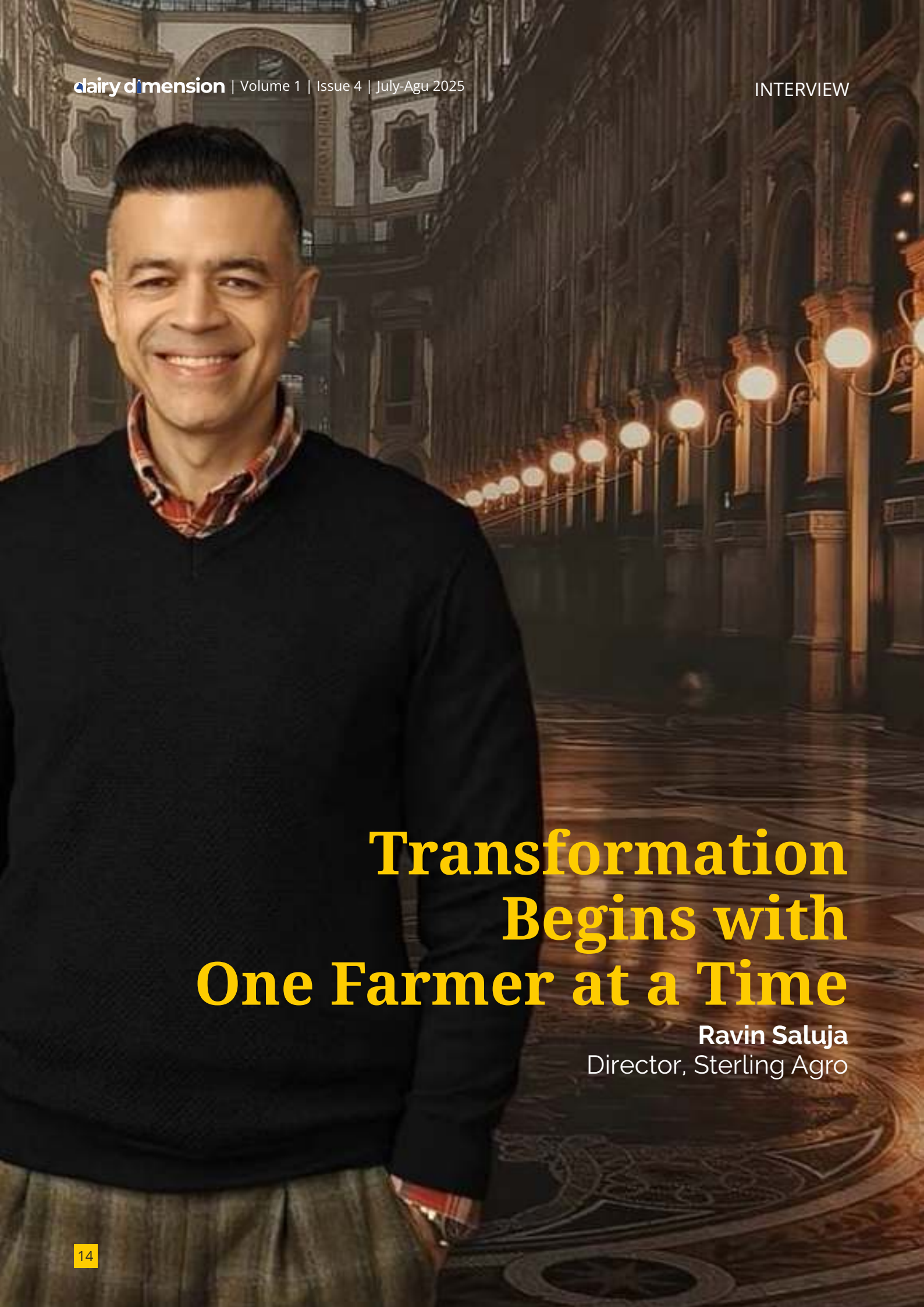
Lessons for Policy and Practice

Maharashtra's dairy sector offers a blueprint for India:

- **Cooperatives** like Gokul prove the enduring power of farmer-owned structures.
- **Private innovators** like Chitale show the transformative potential of technology and genetics.
- **Industrial giants** like Sonai highlight the importance of scale, diversification, and exports.

For policymakers, the message is clear: invest in fodder security, incentivise value-addition, expand genetic programmes, and foster cooperative–private complementarities. For dairy professionals, the case studies reinforce that India's future lies not only in producing more milk, but in producing better, traceable, and higher-value milk products.

Maharashtra, with its rich tradition and cutting-edge innovation, is not just a dairy state; it is a microcosm of India's dairy future.



Transformation Begins with One Farmer at a Time

Ravin Saluja
Director, Sterling Agro

In this exclusive Q&A, Dairy Dimension speaks with Ravin Saluja, Director at Sterling Agro, one of India's leading private dairy enterprises. From his early days in Chandni Chowk to building an international dairy brand, Mr. Saluja shares reflections on policy, farmer engagement, quality challenges, and why real change in Indian dairy starts with one farmer, one family at a time.

Mr. Saluja, could you tell us about your early journey? How did you get into the dairy sector?

Dairy has always been part of my life. My grandfather and father were in the business. Our retail shop was located in the bustling lanes of Chandni Chowk—arguably one of India's most iconic wholesale markets. It was a melting pot of commerce and culture, and that's where my practical education began. During school holidays, I wasn't sent off to camps or coaching classes—I would be found at the shop, usually managing the cash counter, interacting with suppliers and customers alike.

This early immersion gave me firsthand exposure to how dairy retail operates. Later, I began spending more time at our factory, observing quality checks, learning about lab testing, and gaining a deeper understanding of store management. So, there was no fixed date or ceremony when I "joined" the business. I grew into it organically, and in many ways, I still am.

You've seen the industry evolve dramatically. What are the most significant changes?

Back when I started, the dairy business was more straightforward. You sourced good-quality milk, ensured hygiene, and sold it with integrity. There were fewer layers of regulation, less paperwork, and certainly less pressure. But things have changed—and in many ways, for the better.

Today, we operate in an ecosystem of GST compliance, structured SOPs, traceability standards, and rising consumer expectations. One of the most significant reforms has been the introduction of GST, which brought much-needed transparency and curtailed tax evasion.

However, there's a caveat. The GST classification isn't always logical. For instance, placing milk fat—a highly nutritious product—in the 12% bracket, while refined edible oils fall into the 5% bracket, doesn't align with public health priorities. This kind of policy mismatch can hinder sectoral growth.

What has shaped your leadership style over the years?

To be honest, I don't see myself as a leader in the conventional sense. I see myself as a learner. Each day brings new challenges—new market dynamics, supply chain issues, or changing farmer expectations—and with them come fresh opportunities to learn and improve.

I believe leadership is about being present and being responsible. It's about staying grounded while creating value for all stakeholders—whether they are your employees, farmers, or consumers. It's a journey, not a badge.

What makes the North Indian dairy sector unique compared to the South or West?

There are quite a few differences. In Maharashtra and South India, there is a greater sense of industry cohesion. Private processors and cooperatives often work in alignment, especially when it comes to setting procurement prices or managing milk surpluses. They maintain a form of price discipline that benefits both farmers and processors.

In contrast, North India is far more fragmented. There is little to no unity among manufacturers. Milk prices fluctuate frequently, often daily, creating unpredictability. And during elections, state-run cooperatives tend to inflate milk procurement prices—a populist move that disrupts market stability.

Are subsidies distorting the dairy market?

Yes, quite significantly. Currently, if a farmer supplies to a government-run cooperative, he may receive subsidies. But if the same farmer supplies to a private dairy, he doesn't. That, to me, is unfair and discriminatory.

More troubling is the fact that these subsidies are often absorbed into the procurement price rather than being passed directly on to farmers. For instance, in Karnataka, the advertised subsidy of 6 per litre is often embedded in the declared purchase price, so the farmer doesn't see any real gain. Meanwhile, this subsidised milk is being sold in other states, creating an artificial price advantage.

Subsidies should benefit farmers, not distort the market. If states want to support their farmers, they should restrict subsidised products to local markets only.

Let's talk about your farmer engagement model. What are you doing at the grassroots?

We've made it a mission to improve conditions at the farm level, starting with small but impactful changes. In a few villages near Fatehpur, western Uttar Pradesh, we've adopted farmer families and worked with them on chain-free cattle rearing and biogas generation.

We observed that many farmers tether their animals throughout the day, with limited space for movement. We encouraged them to install fencing around their open areas, set up automatic scrubbing posts for the cows, ensure continuous access to water, and provide feed throughout the day. This significantly reduced stress on the animals and improved milk yields by up to 20%.

In parallel, we supported them with affordable biogas digesters. These not only reduce the use of firewood but also save the women of the household from inhaling harmful smoke. The families are healthier, and the savings are real.

We are undertaking this initiative in collaboration with Nestlé and Unilever as part of their sustainability and emissions reduction programmes. It's slow, but impactful work. One farmer at a time.

Is farm inheritance becoming a challenge in India,similar to what is happening in Europe?

Absolutely. The dynamics may be different, but the essence remains the same. In India, many young people are attracted to the glamour of urban life. Social media plays a massive role in creating unrealistic expectations about careers and lifestyles.

What often happens is they move to cities, only to realise that job opportunities are limited, the cost of living is high, and the reality is far from what they imagined. Either they return to their villages disillusioned or end up working jobs that fail to utilise their potential.

I strongly feel that if rural youth used digital tools to promote their agricultural innovations, their farms, or create entrepreneurial content, we would see a rural revival. But unfortunately, less than 1% use it that way. Most are caught up in the noise.

There's growing concern about milk adulteration. How do you ensure quality at Sterling Agro?

Quality starts at the source—the farm. We emphasise farmer training in basic hygiene, including washing hands, cleaning the udder before milking, and sterilising milk cans. These are small steps, but they make a huge difference.

We did a small experiment. Two farmers from the same village—one who received training and one who didn't—showed stark differences in the quality of milk supplied. Cleanliness impacts bacterial count, shelf life, and flavour.

To consumers, I have a strong message: Never buy loose paneer from the open market. It's unhygienic and unregulated. Always choose vacuum-packed paneer. Yes, it may feel firmer because of moisture removal, but it's safe. If needed, soak it in warm water to soften.

And beware of analogue paneer or fake ghee—especially from brands using religious symbolism. These products often mislead consumers in the name of trust.

You have a strong export presence. What are your learnings from international markets?

Exports are challenging but rewarding. When we entered Indonesia, we had to spend almost three years just convincing buyers that our buffalo milk doesn't come from water buffalo, but from black cow buffaloes—a breed known for its superior milk.

Global buyers are sceptical. New Zealand, Australia, and the EU set their benchmarks. We had to conduct detailed lab tests, co-develop trials, and undergo multiple audits. But once trust is built, you gain not just access to a market, you gain credibility.

We now apply the same rigour to our domestic business. Export markets have made us sharper, more process-driven, and far more quality-conscious.

Final thoughts—what is the most critical thing Indian dairy needs today?

In one word: consistency. We need consistency in policies, pricing structures, regulatory enforcement, and farmer engagement.

The current environment is reactive. Every state and every stakeholder has its agenda. However, if we can align on national goals—such as improving productivity per animal or building global-scale processing units—then Indian dairy can truly compete globally.

We must move from subsidy politics to sustainability economics. That's the future.

Note: This interview was conducted prior to the GST Council meeting, where Ravin has been a prominent advocate for the reduction of GST on dairy products.

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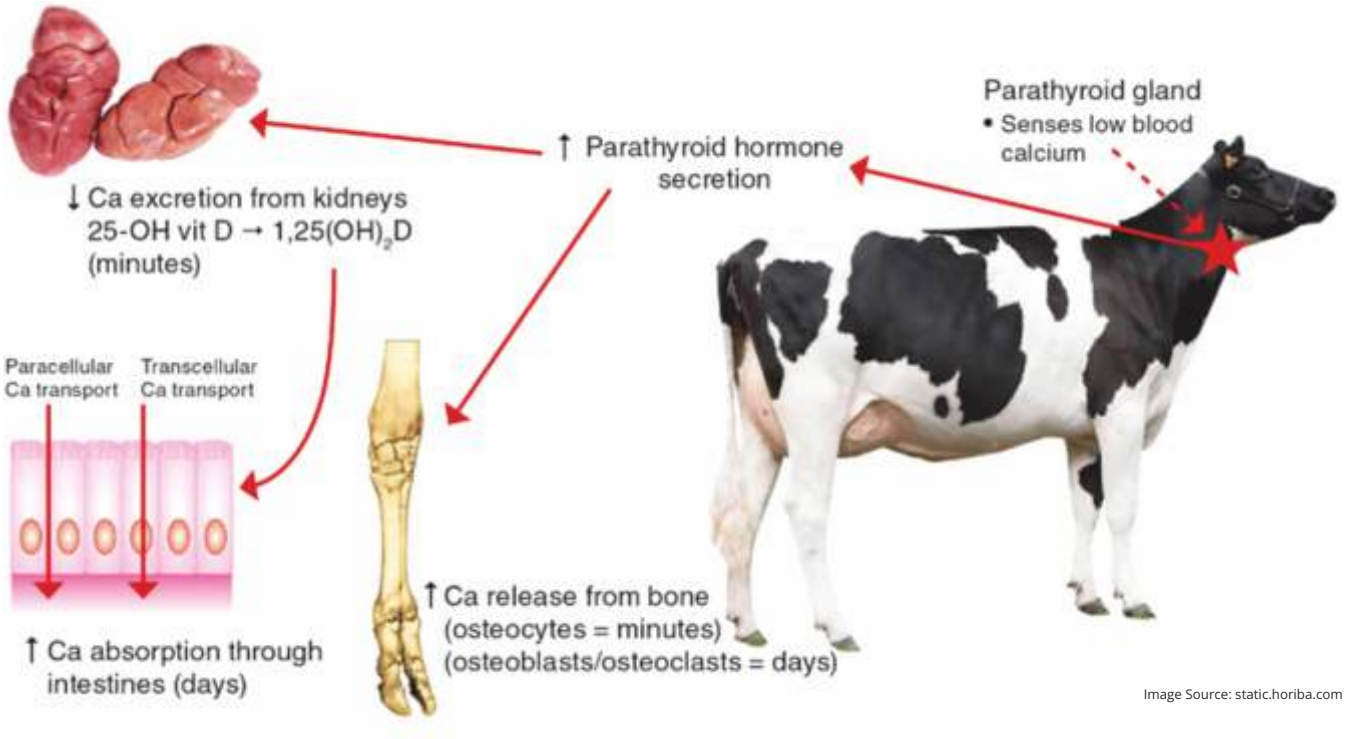

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Calcium Homeostasis in Post-Parturient Dairy Cows: Implications for Health, Productivity, and Metabolic Resilience

by **Dr. Pawar Rutik Namdev & Dr. Shipra Tiwari**, MVSc. Scholar, Department of Livestock Products Technology, College of Veterinary Science and Animal Husbandry, DUVASU Mathura

Dr. Pawar Rutik Namdev

Abstract

Calcium metabolism during the periparturient period plays a crucial role in the health and productivity of dairy cows. The sudden surge in calcium demand for colostrum and milk synthesis immediately after calving often exceeds the body's homeostatic capacity, predisposing cows to both clinical and subclinical hypocalcemia. These disorders not only compromise animal health but also negatively impact fertility, milk production, and overall farm profitability. This review examines the physiological basis of calcium dynamics in post-parturient dairy cows, assesses the consequences of impaired regulation, and discusses practical strategies for its prevention and management. A thorough understanding of these mechanisms is essential for

Dr. Shipra Tiwari

maintaining the productivity and welfare of high-yielding dairy herds.

Introduction

Calcium (Ca) is a vital macromineral involved in numerous physiological processes, including bone formation, nerve conduction, muscle contraction, and blood clotting. In dairy cows, calcium becomes especially critical during the periparturient period due to the sudden onset of lactation. The abrupt increase in calcium demand for colostrum and milk synthesis often exceeds the body's immediate capacity for mobilization and absorption, leading to hypocalcemia.

Post-parturient hypocalcemia, commonly referred to as "milk fever," has long been recognized as a disorder affecting high-yielding cows. However, recent research suggests that subclinical hypocalcemia—though not visibly apparent—may be far more prevalent and equally detrimental. Its hidden impacts on feed intake, immune function, and reproductive performance underscore the need for a deeper understanding of calcium dynamics to design effective preventive strategies.

Physiology of Calcium Homeostasis

Calcium homeostasis in dairy cows is tightly regulated through a complex interplay of hormones and tissues. The key regulatory mechanisms include:

- Parathyroid Hormone (PTH): Secreted in response to declining blood calcium, PTH stimulates bone resorption, enhances renal calcium reabsorption, and increases synthesis of active vitamin D.
- 1,25-Dihydroxyvitamin D (Calcitriol): Produced in the kidneys under the influence of PTH, calcitriol enhances intestinal absorption of dietary calcium.
- Calcitonin: Secreted from the thyroid gland, calcitonin counteracts PTH by inhibiting bone resorption during calcium excess.

In the immediate postpartum period, the outflow of calcium into milk can exceed 30–40 g/day, placing immense stress on these homeostatic systems. The speed and efficiency with which cows adapt determines whether they remain normocalcemic or develop clinical or subclinical hypocalcemia.

Factors influencing hypocalcemia risk include:

- Parity: Multiparous cows are at greater risk due to reduced bone resorption efficiency.
- Breed: Jersey cows are more susceptible compared to Holsteins.
- Diet: High dietary cation-anion difference (DCAD) diets predispose cows to hypocalcemia, while controlled prepartum calcium intake enhances adaptation.
- Genetics: Genetic predisposition to milk fever has been documented, with heritability estimates being low but significant.
- Environmental Stressors: Heat stress, overcrowding, and poor transition cow management exacerbate the risk.

Globally, the prevalence of clinical hypocalcemia ranges from 3% to 10%, while subclinical hypocalcemia may affect up to 50% of multiparous cows in early lactation.

Clinical and Subclinical Hypocalcemia: Differentiating Impacts

- **Clinical Hypocalcemia (Milk Fever):** Characterized by recumbency, muscle weakness, cold extremities, and potentially coma if left untreated. Immediate intravenous calcium therapy is required.
- **Subclinical Hypocalcemia (SCH):** Defined as blood calcium <2.0 mmol/L without obvious clinical signs. SCH leads to immunosuppression, reduced dry matter intake, and increased risk of secondary disorders such as ketosis, displaced abomasum, mastitis, and impaired fertility.

While clinical cases are more visible, SCH imposes a far greater hidden economic burden by reducing herd productivity and longevity.

Economic Implications

The economic cost of hypocalcemia extends far beyond treatment expenses. It includes:

- Reduced milk yield in the subsequent lactation
- Increased incidence of secondary disorders (e.g., metritis, mastitis)
- Impaired reproductive performance and prolonged calving intervals
- Higher culling rates of affected cows

Preventive and Management Strategies

Effective management of hypocalcemia requires a multi-faceted approach:

Nutritional Interventions

- Low-Calcium Diets Prepartum: Feeding diets containing <20 g Ca/day promotes increased sensitivity to PTH, reducing risk at calving.
- DCAD Manipulation: Feeding diets with a negative DCAD (via anionic salts) induces mild metabolic acidosis, improving calcium mobilization.
- Magnesium Supplementation: Adequate Mg intake is essential for optimal PTH receptor responsiveness.
- Postpartum Calcium Supplementation: Oral calcium boluses immediately after calving can help prevent relapse in high-risk cows.

Genetic and Breeding Approaches

- Selective breeding for cows with greater resilience in calcium homeostasis
- Use of genomic markers associated with reduced susceptibility to hypocalcemia

Precision Livestock Farming (PLF) Tools

- Real-time monitoring of blood calcium using biosensors
- Activity and rumination sensors to detect early signs of hypocalcemia
- Automated supplementation systems integrated with precision dairy management

Therapeutic Advances

- Intravenous calcium gluconate remains the standard treatment for clinical cases
- Controlled-release oral calcium formulations enhance efficacy and compliance
- Emerging use of novel feed additives (e.g., plant bioactives, probiotics) to improve mineral metabolism

Emerging Research and Innovations

Recent advances in dairy science are paving the way for novel solutions:

- Nanotechnology-Based Mineral Delivery: Nano-calcium formulations may enhance bioavailability.
- Microbiome Modulation: The gut microbiota influences calcium absorption; probiotics and prebiotics hold promise in this area.
- Endocrine Modulators: Continued research focuses on optimizing PTH and calcitriol activity.
- Digital Twins and AI Models: Simulations of cow physiology help predict hypocalcemia risk and customize interventions at both herd and individual levels.

Implications for Dairy Sustainability

Effective calcium management is not only a matter of animal health but also one of long-term sustainability. Healthier cows experience fewer metabolic disorders, reducing drug use, lowering culling rates, and improving resource efficiency. These benefits align with global priorities for climate-smart and welfare-oriented dairy farming.

Future Directions

- Development of genetic lines with superior transition period resilience
- Wider adoption of PLF-based monitoring systems in commercial dairy operations
- Integration of nutrition, genetics, and data-driven decision-making models
- Strengthening extension services to improve farmer awareness and training

Conclusion

Calcium dynamics in post-parturient dairy cows represent a cornerstone of effective transition cow management. While clinical milk fever has long been recognized, the hidden burden of subclinical hypocalcemia continues to undermine dairy herd health and productivity worldwide. Advances in nutrition, genetics, technology, and precision livestock farming offer powerful tools to mitigate this risk. Ultimately, a holistic approach—integrating preventive strategies, farmer education, and scientific innovation—is essential to enhance cow resilience, safeguard productivity, and ensure the sustainability of the global dairy industry.

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Case Study: Farm to Factory Integration in India's Dairy Sector

by **Richi Agarwal,** Founder of RA Consulting

Introduction

India's dairy sector is a paradox. It is the world's largest by volume, producing over 220 million tonnes of milk annually, yet it struggles with issues of quality, efficiency, and market competitiveness. The gap between farm and factory operations is a major contributor. While cooperatives and private players alike possess infrastructure and farmer networks, the lack of integration often results in inefficiencies, product inconsistencies, and lost market share.

This case study examines integration challenges across Indian dairies, highlighting systemic issues, opportunities for reform, and the risks of inaction.

When Legacy Systems Hold Back Progress

Kalki Dairy, a 70-year-old cooperative in western India, had procurement capacity of over 200,000 litres per day. Despite this, sales fell by 7–8 per cent annually. The reasons were systemic:

- Stagnant procurement zones meant competitors lured farmers away.
- Milk quality was compromised by non-functional testing equipment, poor hygiene, and low MBRT values (as low as 30 minutes).
- Farmers disengaged due to lack of veterinary support and advisory services.
- Products like packaged curd, buttermilk, and ice cream failed to differentiate in urban markets already crowded with newer, more innovative brands.

This illustrates the cost of silos, where procurement, production, and marketing worked in isolation, undermining competitiveness.

How Private Players are Reframing Integration

In contrast, several private dairies have actively invested in quality assurance and farmer support. Automated testing systems, cold-chain investments, and farmer

extension programmes have raised MBRT levels to 2.5–3 hours, directly improving product quality and consumer trust. Their ability to align farm-level practices with urban consumer expectations shows how integration can drive margins and create differentiation.

The Global Market Lens

Export-oriented processors face a unique test. While demand for products like skimmed milk powder, butter, and ghee is rising in the Middle East and Asia, inconsistent quality undermines credibility. International buyers often demand traceability and antibiotic-free assurances—areas where Indian dairies still lag due to weak integration between procurement and compliance systems. Without farm-to-factory alignment, export opportunities risk being lost.

Opportunities in Deeper Integration

1. **Farmer Loyalty through Services**

   Veterinary support, feed advisory, and transparent pricing models strengthen farmer relationships. Cooperatives that combine procurement with training and healthcare initiatives have successfully retained suppliers.

2. **Quality as a Market Differentiator**

   Investing in functional testing, hygiene protocols, and cold chain logistics raises MBRT, improves shelf life, and reduces product returns. Quality is not just compliance—it is an economic driver.

3. **Consumer-Centric Innovation**

   Urban consumers seek differentiation: probiotic curd, high-protein milk, antibiotic-free assurances. Integration ensures consumer needs are matched by farm-level practices.

4. **Export Competitiveness**

   Aligning procurement practices with global quality standards—antibiotic residue checks, aflatoxin monitoring, traceability systems—can unlock new markets. Integration is the bridge between domestic production and global competitiveness.

Challenges Hindering Integration

- **Legacy Pride vs Present Reality:** Older cooperatives often resist change, clinging to past success while consumers and competitors move ahead.
- **Capital Intensity:** Investments in testing, cold chain, and farmer services require significant funding, which many cooperatives struggle to mobilise.
- **Governance Discipline:** Strategies collapse without execution rigour, weekly reviews, and transparent KPIs. Bureaucratic delays often derail reform.
- **Fragmented Markets:** Urban consumers demand premium products, while rural markets prioritise affordability. Balancing both ends requires agility.
- **Policy and Regulation:** Standards enforcement remains uneven, weakening incentives for quality improvements.

Richi Agarwal

Richi Agarwal is the Founder of RA Consulting, a firm specialising in business transformation and process revival in the dairy and agri-food sector. With extensive experience advising cooperatives and private processors, she combines farm-level economics with market insights to help organisations achieve sustainable growth.

Lessons for India's Dairy Sector

1. **Integration is Risk Management:** Aligning farmers, factories, and markets reduces hidden costs and safeguards margins.
2. **Farmer-Centric Models Build Resilience:** Loyalty cannot be bought only with price; it is built on trust and services.
3. **MBRT is an Economic Metric:** Longer MBRT translates into extended shelf life, better exports, and consumer confidence.
4. **Differentiation Sustains Brands:** Commodity milk is easily replaceable; branded narratives around purity, traceability, or nutrition create stickiness.
5. **Execution Discipline is Critical:** Turnarounds fail not because plans are wrong, but because they are poorly implemented.

Conclusion

Farm-to-factory integration is not a slogan—it is the foundation of competitiveness in India's dairy economy. The Kalki Dairy case shows how silos can lead to decline, while other experiences demonstrate the rewards of integration.

As India looks ahead to both modernise its domestic sector and expand globally, dairies that align farmers, factories, and markets will lead. Those that fail to integrate risk irrelevance.

Fonterra Raises Milk Price Forecast

Fonterra, New Zealand's largest dairy cooperative, has revised its 2024/25 farmgate milk price forecast, lifting the midpoint from NZ$10.00 to NZ$10.15 per kilogram of milk solids (kgMS). The range was narrowed to NZ$9.75–10.55, signalling greater confidence in market stability. The upward revision reflects steady global dairy prices, strong demand from Asia, and a solid sales book for powders and fats. For New Zealand farmers, the change translates into improved cash flow, particularly crucial during a year of high input costs. For global buyers, however, higher farmgate prices may reinforce already firm Oceania benchmarks, affecting import-dependent countries. The forecast also sets expectations for milk supply recovery after a challenging previous season. For dairy professionals, Fonterra's pricing signals remain a barometer for global commodity sentiment. The revised forecast suggests that while volatility persists, demand from Asia and the Middle East continues to underpin markets, providing relative stability compared to recent years.

China Extends Anti-Subsidy Probe into EU Dairy

China has extended its anti-subsidy investigation into European Union dairy imports — covering cheese, milk, and cream — until February 2026. The investigation, launched in 2024 amid broader EU–China trade tensions, now prolongs uncertainty for exporters in France, Ireland, and the Netherlands. EU dairy companies fear potential countervailing duties that could erode competitiveness in China, one of the world's largest growth markets for cheese and premium dairy. The extension underscores how trade disputes in sectors like electric vehicles are spilling into agri-food. For European producers already grappling with flat domestic demand, China remains a critical growth outlet. The delay, however, hampers forward contract negotiations and supply chain planning. For dairy professionals, the episode illustrates how trade politics increasingly shape dairy markets. Exporters must prepare for scenarios of restricted Chinese access and diversify markets in Asia-Pacific and the Middle East. Equally, it reflects China's growing use of trade instruments to protect domestic industries and assert leverage in negotiations with Brussels.

FAO Dairy Price Index Holds Flat in July

The FAO Dairy Price Index averaged 152.6 points in August 2025, easing 1.3% from July and extending its downward trend for a second month. Despite this softening, the index still stands 16.2% above its August 2024 level, underscoring the broader tightness in global dairy markets. The decline was mainly driven by lower quotations for butter, cheese, and whole milk powder, as robust production in New Zealand and the European Union coincided with muted import demand from key Asian buyers, particularly in China and Southeast Asia. However, the downward pull was partly cushioned by firmer skim milk powder (SMP) values, reflecting constrained availability in New Zealand. This divergence within product categories points to a market balancing act: strong supply-side performance in traditional exporters is weighing on fat- and protein-rich dairy commodities, while selective tightness in powders signals continued vulnerability to supply disruptions and shifting demand patterns.

France Containment of Lumpy Skin Disease

France has successfully contained a recent outbreak of lumpy skin disease (LSD), reporting zero new cases after August 22 thanks to mass vaccination efforts. Earlier in the summer, LSD cases disrupted cattle movement, raising alarms for raw-milk cheese producers and livestock exporters. The rapid containment is being hailed as a success for coordinated veterinary intervention and EU-level support. For French dairy, the immediate relief is significant: LSD outbreaks risk not only livestock health but also France's reputation as a premium dairy exporter. The episode, however, highlights ongoing vulnerabilities in Europe to transboundary animal diseases, especially amid climate-linked shifts in vector patterns. For dairy professionals, the incident reinforces the economic stakes of animal health. A few weeks of disruption threatened PDO (protected designation of origin) cheese exports and raised questions about compensation frameworks for farmers. With international markets increasingly sensitive to disease risk, the French case demonstrates how fast and coordinated veterinary responses can preserve both production and trade credibility.

Italy–U.S. Dispute over Cheese Tariffs

Italy has lodged complaints with U.S. customs authorities after reports that Parmigiano Reggiano and Grana Padano shipments were being charged tariffs higher than the 15% agreed under the new EU–U.S. trade framework. Italian dairy associations have warned that the discrepancy risks eroding margins and damaging competitiveness in the lucrative American market, where premium Italian cheeses enjoy strong demand. The issue comes just weeks after Brussels and Washington announced progress toward easing agri-food trade tensions. Italy is pushing for enforcement of agreed tariff terms, highlighting sensitivities around origin-linked cheeses, which are vital to the country's export economy. For dairy professionals, this development underscores how tariff administration, not just headline agreements, can create uncertainty. U.S. importers may hesitate to place large orders amid ambiguity, and Italian exporters face potential short-term disruptions. The dispute illustrates the fragility of transatlantic trade frameworks and the importance of vigilance in monitoring customs enforcement, especially for high-value dairy categories where margins are already squeezed by rising input costs.

EU–U.S. “Fair and Balanced” Trade Framework Advances

The EU and U.S. have announced progress on a framework for “reciprocal, fair and balanced” trade, with provisions set to extend most-favoured nation (MFN) treatment to certain dairy categories beginning September 1. The framework aims to reduce disputes and stabilise trade relations, but agricultural carve-outs remain politically sensitive. Dairy is particularly contentious: the U.S. seeks expanded access for cheese, while the EU is protective of its geographical indications (GIs). While headline progress is welcome, details remain limited, leaving exporters uncertain about the exact scope of benefits. For dairy professionals, the framework offers both opportunities and risks. On the one hand, reduced tariff barriers could expand market access for certain EU dairy products. On the other, unresolved disputes over GI protections and tariff-rate quotas mean trade frictions could flare up again. The framework should be seen as a step toward stabilisation, but not a resolution. Exporters on both sides must remain cautious in long-term planning until the final implementation details are clearer.

GLOBAL NEWS

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Karnataka Milk Federation to Launch Lactose-Free and Buffalo Milk

The Karnataka Milk Federation (KMF), a dairy cooperative second in scale only to Amul, is diversifying its portfolio to capture premium consumer segments. Plans are underway to launch lactose-free milk under the Nandini brand — a strategic response to rising urban demand for functional dairy products catering to health-conscious and lactose-intolerant consumers. Southern India has already seen early movers such as Milky Mist successfully market lactose-free offerings, highlighting the opportunity size. Simultaneously, KMF is scaling up buffalo milk procurement, particularly in North Karnataka, where demand is surging thanks to buffalo milk's higher fat content, its preference in traditional sweets, and its premium positioning for paneer production. This dual strategy reflects how cooperatives are evolving: beyond simply handling procurement volumes, they are beginning to design consumer-oriented portfolios that align with lifestyle trends and nutritional preferences. For dairy professionals, the move underscores an emerging playbook where cooperatives must safeguard farmer payouts while capturing new consumer niches, using innovation and product differentiation as competitive levers. The success of KMF's initiative could set a benchmark for other cooperatives balancing commodity oversupply (like SMP) with higher-value downstream products.

India Ratings Projects 5% Growth in Milk Output

India Ratings and Research (Ind-Ra) forecasts India's milk production to grow by around 5% in FY25, reinforcing the country's position as the world's largest milk producer. The report highlights resilience among smallholder farmers, favourable policy interventions, and ongoing investments in chilling and processing infrastructure. Per capita milk availability is expected to rise by 4%, supported by stable population growth and consistent productivity improvements. The analysis underlines dairy's central role in rural livelihoods, particularly for women and marginal farmers, where milk sales often serve as supplementary income. For the industry, rising supply creates both opportunities and challenges. While demand for fresh liquid milk remains steady, the bigger question is how to absorb surpluses of skimmed milk powder (SMP) and fats. This creates an urgent need for value-added products, diversified exports, and better integration between cooperatives and private processors. For dairy professionals, the projection reinforces the importance of moving beyond volume-driven growth toward profitability-driven strategies. Without stronger demand-side innovation, India risks repeating the cycle of overproduction and suppressed margins that has characterised several past years.

FMD Outbreak in Ludhiana Dairy Complex

The recent outbreak of foot-and-mouth disease (FMD) in Ludhiana's Haibowal dairy complex has sounded an alarm across Punjab's dairy community. As one of India's largest urban dairy hubs, the complex houses thousands of animals in dense proximity — making biosecurity lapses particularly costly. Farmers reported panic as cattle exhibited symptoms, with concerns about productivity losses, animal health, and income shocks. Municipal authorities faced criticism for weak waste disposal and inadequate disease management. The outbreak is a stark reminder that even as Punjab invests in genetics and productivity, the foundations of disease surveillance and veterinary infrastructure remain fragile. For cooperatives and policymakers, FMD is not only a farmer issue — it directly threatens milk supply continuity, processing plant utilisation, and consumer confidence in milk safety. For dairy professionals, this incident highlights the urgent need to integrate systematic vaccination drives with modern biosecurity protocols: digital livestock traceability, quarantine measures, and waste management systems. The economic cost of such outbreaks — lower yields, treatment expenses, and reduced market access — far outweighs the preventive investment. Punjab's FMD flare-up is therefore a timely warning to strengthen the weakest links in India's dairy chain.

Punjab Pushes Genetics with GADVASU–PDFA MoU

Punjab, India's high-yield milk state, is turning its attention to genetic improvement to sustain productivity growth. Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) has partnered with the Progressive Dairy Farmers' Association (PDFA) to establish a breeding programme focused on Holstein Friesian and Jersey calves from elite herds. Selected male calves will contribute to a structured semen bank, providing affordable, high-quality genetics to farmers across the state. This initiative is crucial: while Punjab boasts among the highest per-animal milk yields, concerns about rising herd health costs, inbreeding, and

productivity plateaus persist. By reducing reliance on expensive imported semen, the programme lowers barriers for small and marginal farmers, democratising access to superior germplasm. It also institutionalises farmer–university collaboration, combining scientific rigour with farmer networks. For dairy professionals, the MoU signals a future where productivity gains will increasingly depend on genetic improvement, not just feed or management interventions. It also highlights the need for structured progeny testing and farmer education on genetics. If executed effectively, this partnership could be a model replicated across India, blending cooperative farmer strength with institutional science for long-term productivity sustainability.

U.S. Tariffs Create Uncertainty for Indian Dairy Exports

The U.S. has imposed new tariff hikes on a range of Indian exports, creating ripple effects for India's dairy sector. While India exports relatively modest volumes of dairy to the U.S., value-added categories such as paneer, ghee, and milk protein ingredients are particularly vulnerable. These tariffs could dampen competitiveness, especially against established exporters like New Zealand and the EU, who already enjoy preferential access under trade agreements. For Indian cooperatives and private processors with export ambitions, the development highlights the fragility of relying on tariff-dependent markets. Analysts note that Indian exporters may need to redirect focus toward the Middle East and Asia, where demand for Indian dairy fats remains strong and tariff barriers are lower. For dairy professionals, the episode illustrates a larger lesson: global trade is shaped as much by geopolitics as by market fundamentals. Exporters will need to adopt more sophisticated strategies, including exploring overseas manufacturing bases, investing in tariff-resilient value chains, and lobbying for favourable trade deals. The tariff hikes, although not catastrophic for volumes, highlight the necessity of long-term trade diversification and resilience in India's export strategy.

Amul Explores Overseas Production to Circumvent Tariffs

Amul, India's largest dairy brand, is reportedly exploring setting up manufacturing facilities overseas, particularly in the U.S., to mitigate the impact of tariff barriers and logistical complexities. Such a move would mark a paradigm shift for Indian cooperatives, which traditionally export from domestic plants. By producing paneer, butter, and cheese within the U.S., Amul could gain tariff-free access, improve shelf-life, and align more closely with consumer expectations for freshness. This strategy mirrors the playbook of global majors like Nestlé and Arla, which have localised production in multiple markets. For Amul, the overseas push reflects both opportunity and necessity: Indian dairy exports are constrained by high logistics costs and volatile tariff regimes, while demand for ethnic dairy products like paneer is rising in the U.S. diaspora. For dairy professionals, the development signals the beginning of a more outward-looking phase for Indian cooperatives. It raises strategic questions: How will Amul balance farmer-centric domestic commitments with global expansion? Will other cooperatives follow suit? If successful, this could reshape India's dairy export narrative from a commodity-driven story to a globalised consumer-brand play.

Jaipur Dairy Opens 15-Crore Sweets Plant with SCADA Automation

Jaipur Dairy, under the Rajasthan Cooperative Dairy Federation (RCDF), has commissioned a new 15-crore sweets production facility, equipped with Supervisory Control and Data Acquisition (SCADA) automation. The facility will produce Saras-branded sweets, marking the cooperative's entry into the branded Indian confectionery space. This expansion is not merely diversification; it's a financial necessity in today's cooperative landscape. With India's milk surplus leading to excess skimmed milk powder (SMP), many cooperatives are struggling to convert low-margin commodities into profitable formats. By channeling surplus into sweets, Jaipur Dairy creates a high-demand outlet that aligns with cultural consumption patterns, particularly around festivals. SCADA-based automation ensures hygienic, standardised production, addressing consumer concerns about quality and safety in mithai markets often dominated by unorganised players. RCDF, one of India's largest SMP producers, benefits doubly: reducing oversupply pressure while elevating brand Saras into a trusted name for premium, hygienic sweets. For professionals, this represents a textbook case of downstream integration and value-added product innovation. It also reinforces how Indian cooperatives are shifting from being milk processors to branded food companies, using technology and product innovation to build resilience in volatile milk markets.

India's Dairy Sector Gains Global Spotlight with Four Finalists at IDF Dairy Innovation Awards 2025

Strategic sustainability, digital transformation, and grassroots innovation place India firmly on the global dairy innovation map

India's dairy sector, often regarded as the backbone of rural livelihoods and national nutrition, is now being recognised for something more: its capacity to innovate, scale, and lead on the global stage. At the upcoming IDF Dairy Innovation Awards 2025, four Indian initiatives have been shortlisted as finalists, marking a significant shift in the country's positioning within the global dairy ecosystem.

Hosted by the International Dairy Federation (IDF) and supported by Tetra Pak, the awards recognise global excellence in sustainable practices, processing innovation, animal care, and socio-economic development across the dairy value chain. The winners will be announced at the IDF World Dairy Summit on October 21, 2025, in Santiago, Chile — the first time the summit is being held in South America.

India's four finalist projects span climate action, digital technology, sustainable processing, and smallholder empowerment, highlighting a diversified portfolio of innovation and purpose-driven growth.

India's Finalist Projects: A Cross-Section of Sustainable Progress

Jaipur Dairy (SARAS), Rajasthan

Category: Sustainable Processing Innovation

Jaipur Dairy has been recognised for its implementation

of a Zero Liquid Discharge (ZLD) system, the first of its kind in India's dairy sector. The plant recycles more than 660,000 litres of water per day, achieving closed-loop water usage and significantly reducing environmental discharge. The project has been deemed scalable and replicable, with the Rajasthan Cooperative Dairy Federation (RCDF) initiating ZLD deployments across other dairy unions in the state. The initiative reflects India's evolving focus on eco-conscious processing infrastructure.

National Dairy Development Board (NDDB)

Category: Innovation in Climate Action in the Dairy Sector

NDDB's biogas initiative demonstrates how environmental stewardship can intersect with rural energy access and income generation. The programme converts livestock manure into biogas for clean fuel use and creates additional revenue streams through carbon credit generation. By addressing methane emissions,

one of the most potent greenhouse gases, NDDB contributes directly to climate-smart dairy farming, while reinforcing the economic viability of smallholder-led operations.

Bharat Sanjeevani

Category: Innovation in Animal Care in Farming

Bharat Sanjeevani has introduced an AI-powered veterinary care model that enables real-time livestock health monitoring via mobile tools. The platform empowers smallholder farmers with access to early diagnostics and improved disease management strategies, thereby reducing their dependency on antibiotics and enhancing animal welfare. It represents a significant step forward in the digitisation of animal health services in India's rural landscape and demonstrates the potential of technology in achieving scale and accessibility.

NITARA

Category: Innovation in Socio-Economic Sustainability in Farming

The NITARA mobile platform has been recognised for its role in transforming smallholder dairy operations through AI-driven farm management tools. It enables farmers to track milk production, optimise feed planning, monitor animal health, and receive customised advisory support. Designed for both connected and offline environments, the platform bridges the digital divide and improves decision-making capacity at the grassroots level. NITARA exemplifies how data and accessibility can work together to create measurable socio-economic uplift.

India's Rising Role in Global Dairy Innovation

The IDF Dairy Innovation Awards serve as a lens into the evolving dynamics of the global dairy industry. While entries came from over 130 organisations across several continents, India's visibility across multiple categories signals a clear trend: the Indian dairy sector is no longer just a volume player; it is an innovation-driven, sustainability-conscious ecosystem.

This transition is shaped by policy support, cooperative development models, and the infusion of digital and climate-smart technologies into traditional dairy practices. The selected projects highlight the sector's responsiveness to challenges such as resource efficiency, climate risk, and digital inclusion.

India's participation is particularly noteworthy for its diversity, not only across award categories, but also in terms of the stakeholders involved. Public institutions, farmer cooperatives, and private technology providers are all contributing to a shared vision for a more resilient and future-ready dairy economy.

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