HEALTHY HERDS, SAFER MILK - MANAGING SOMATIC CELL COUNT



2025

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EXECUTIVE SUMMARY

India's domestic milk supply is compromised by the widespread presence of high Somatic Cell Count (SCC) milk, a key indicator of infection and inflammation in dairy cattle that poses grave risks to public health, animal welfare, and the national economy. The absence of a mandatory regulatory limit for SCC in milk sold within the country symbolizes a major gap in India's food safety framework, creating a dual standard where exported milk must meet stringent quality criteria whereas Indian domestic consumers continue to access milk with compromised food safety. This policy brief calls for the immediate establishment of a mandatory, science-based regulatory limit for SCC, aligning India with global best practices and fulfilling the Food Safety and Standards Authority of India's (FSSAI) mandate to ensure safe and wholesome food for all citizens. Implementing a national SCC standard is a pro-farmer, pro-industry, and pro-consumer policy that promises to protect consumers from the risk of foodborne illnesses and Antimicrobial Resistance (AMR), alleviate the suffering of millions of dairy animals, and also tap the economic potential for the entire dairy value chain.

1. SOMATIC CELL COUNT & ITS UNREGULATED NATURE

SCC is the internationally accepted standard for measuring milk quality and is a primary indicator of the udder health of dairy cattle (Radostits et al., 2007). It is a direct measure of the number of somatic cells, a combination of the animal's immune cells and milk-producing cells, per milliliter of milk. An elevated SCC is a clear sign of an udder infection, known as “mastitis”, which the animal’s body is actively fighting. While milk with an SCC around 100,000 cells/mL is considered normal and healthy, levels exceeding 200,000 cells/mL are indicative of an infection (Smith et al., 2001).

Mastitis is categorised as ‘Clinical Mastitis (CM)’, which is marked by visible signs like udder swelling and abnormal milk(flakes/clots/watery consistency), and ‘Subclinical Mastitis (SCM)’. SCM occurs 15 to 40 times more often than the clinical form, and its duration is longer. The primary danger of SCM lies in its insidious nature, as it shows no physical symptoms. It nevertheless results in decreased milk production and a rise in SCC (Cobirka et al., 2020).



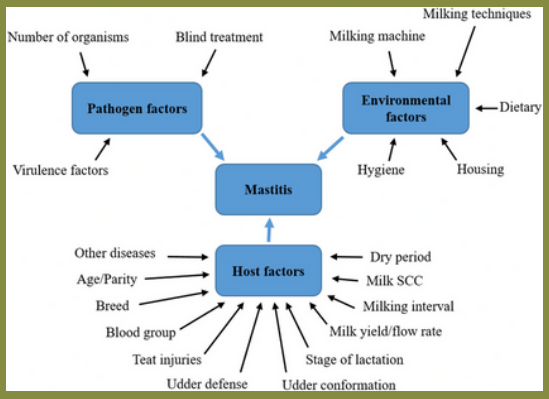


Figure 1. Factors influencing the incidence of mastitis (Zigo et al., 2021).

The high prevalence of subclinical mastitis is associated with different factors, including herd size, milk marketing, agro-climatic conditions of a region, animal owner education level, variations in sociocultural practices, feeding methods, and management. (Joshi & Gokhale, 2006).

The milk from an animal with SCM often appears perfectly normal, even with SCC as high as two million somatic cells per milliliter (Danieli, Schogor, Zucchi, & Neto, 2025). In the absence of SCC regulation in India, milk from infected animals is inevitably pooled with milk from healthy ones, contaminating the entire batch, which then eventually flows into both formal and informal markets. In this context, it is also to be noted that it is the milk from the subclinical compared to clinical cases that has higher contents of pathogenic mastitis-causing bacteria (Schadt, 2023).

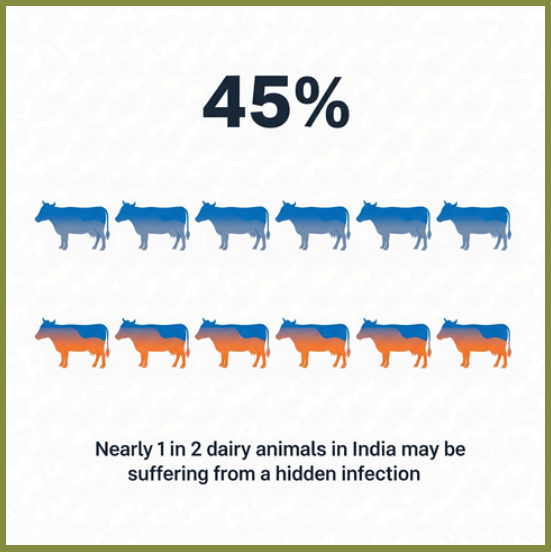


Figure 2. The staggering scale of the SCM issue in India

A landmark meta-analysis published in 2021, which systematically reviewed 140 distinct Indian studies conducted from 1995 to 2019, calculated a pooled prevalence for SCM at an alarming 45% (Krishnamoorthy et al., 2021). This means that on any given day, nearly half of India's dairy herd could be suffering from an udder infection that undermines the quality and safety of the milk they produce.

The lack of regulation for high SCC milk culminates in a spectrum of far-reaching consequences for the agricultural, economic, and public health sectors.

2. THE RIPPLE EFFECT OF SYSTEMATIC RISKS FROM UNREGULATED SCC

The failure to regulate SCC imposes a severe and interconnected threefold burden on the nation, compromising public health, animal welfare, and economic stability. These are not separate issues but a deeply linked causal chain, where poor animal health directly leads to public health risks and financial losses that reverberate throughout the dairy value chain. A single policy intervention, that is, regulating SCC, can address this crisis at its core nexus, with far-reaching benefits.



Figure 3. The Threefold Burden of Unregulated SCC

2.1 EROSION OF PUBLIC HEALTH

An unregulated, high SCC is not a simple quality issue; it is a clear warning sign of infection in dairy animals, that is, mastitis, which directly compromises the quality of the milk that consumers drink every day. The National Mastitis Council, a global authority on the subject, has identified several critical public health risks associated with high-SCC milk, all of which are relevant to the Indian context (National Mastitis Council, 2020).

Pathogenic Bacteria and Toxins: High SCC is a primary indicator of mastitis, an udder infection caused by bacteria, many of which are also human disease-causing pathogens. These include harmful bacteria such as *Staphylococcus aureus, Streptococcus agalactiae,* and coliform bacteria like *Escherichia coli*, which can contaminate the milk supply (National Mastitis Council, 2020). While pasteurization is effective at killing most bacteria, it does not eliminate the heat-resistant toxins that some of these pathogens produce. These toxins can survive the heating process and remain in the milk, posing a threat to consumers even after the milk has been processed (National Mastitis Council, 2020). Elevated SCC milk has public health consequences such as *Staphylococcal Food Poisoning* (characterized by gastroenteritis, diarrhea) and *E. coli (STEC) infection* (which can even lead to kidney failure) and so forth (Bhavani et al., 2025; Joseph & Kalyanikutty, 2022; Schadt, 2023).

Antibiotic Residues and AMR: There is a strong positive correlation between high-SCC milk and the presence of illegal antibiotic residues. Mastitis in India is the most common bacterial disease subject to the rampant use of antibiotics to treat mastitis (Sinha, 2020). In our nation, there is limited compliance with antibiotic withdrawal periods following treatment of dairy animals, and, more alarmingly, this contributes to the "silent pandemic" of AMR, a growing global health crisis (Sahoo et al., 2023). The issue was already flagged by the FSSAI's National Milk Safety and Quality Survey (2018), which reported the detection of antibiotic residues exceeding permissible tolerance limits in milk samples (Food Safety and Standards Authority of India (Food Safety and Standards Authority of India [FSSAI], 2019).

Marker of Poor Hygiene: High SCC levels are often a reflection of poor overall farm hygiene and management practices. This indicates an increased risk of contamination from other dangerous environmental pathogens, such as Salmonella, Campylobacter, and Listeria, which can thrive in unhygienic farm conditions (National Mastitis Council, 2020). E. coli, another mastitis-causing foodborne pathogen, is an indicator of poor hygienic and sanitary practices during milking and storage (Joseph & Kalyanikutty, 2022).

Degraded Nutritional Profile: Beyond these direct risks, high SCC also degrades the nutritional value of milk. The presence of SCM, as indicated by elevated Somatic Cell Counts (SCC), fundamentally alters the biochemical profile of milk. The inflammation associated with mastitis releases enzymes that break down essential proteins (like casein) and fats, reducing the milk's nutritional profile and shortening the shelf-life of dairy products (Alhussien & Dang, 2018). This is scientifically demonstrable, as shown in the table below, which details the biochemical changes in milk as SCC levels rise.

Milk constituents	Healthy	Subclinical mastitis	Clinical mastitis
SCC (10^5 cells/ml)	<2	3-5	>5
Fat (%)	4.32	4.31	4.08
Protein (%)	3.30	3.34	3.70
Casein	2.70	2.55	2.25
Whey protein	0.84	1.13	1.35
Serum albumin	0.17	0.24	0.37
Lactose (%)	4.84	4.71	4.41
SNF (%)	9.73	9.61	9.35
pH	6.61	6.63	6.80
EC (mS/cm)	5.90	6.01	7.21
Chloride	0.09	0.13	0.16
Sodium	0.05	0.09	0.11
Potassium	0.18	0.16	0.13

SCC=Somatic cell counts, SNF=Solids-not-fat

Table 1. Variations in the milk quality of cow in relation to Mastitis.

Note: These values are drawn from Alhussien & Dang, 2018. They illustrate the progressive deterioration of milk quality with increasing SCC. The data is sourced from a 2016 study on the indigenous breed (Tharparkar) and is presented as a representative example; actual figures can vary based on breed, diet, and environment (Alhussien et al., 2016). Incidentally, crossbred cows, which are bred for high milk production, are more prone to mastitis compared to indigenous breeds (Department of Animal Husbandry & Dairying [DAHD], 2025).

Additionally, FSSAI has certain parameters for various milk constituents in the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011. Due to high-SCC, there is likely degradation of the nutritional profile and also safety metrics, thereby failing to meet the FSSAI's stipulated standards for milk as well.

2.2 ANIMAL WELFARE AT RISK

An elevated SCC is more than a technical measure of milk quality; it is a direct window into the pain and suffering of dairy cattle. Although farmers are quick to spot the obvious signs of clinical mastitis, the widespread prevalence of subclinical mastitis means that millions of animals endure a state of "silent suffering" that goes unnoticed and untreated without objective SCC testing.

Scientific evidence confirms that this suffering is significant and measurable. Physiologically, the pain of mastitis is well-established; studies of clinical cases show that affected cows have a heightened sensitivity to discomfort (Leslie & Petersson-Wolfe, 2012). This suffering exhibits in more subtle ways in subclinical cases, where the primary evidence is behavioral. (Leslie and Petersson-Wolfe, 2012). This pain manifests in their behavior. Affected cows display clear sickness behaviors such as restlessness, reduced appetite, and social withdrawal. A key finding from behavioral ethology is the disappearance of "luxury behaviors"- such as social grooming, playing, and exploring, which is a sensitive marker that an animal's welfare has shifted from a state of thriving to one of merely surviving (Caplen & Held, 2021). This suffering is grounded in a powerful biological stress response. The pain from the udder infection activates the body's primary stress pathway, flooding the system with stress hormones like cortisol. The presence of these stress biomarkers in the blood and milk of affected animals provides systemic proof of their distress (Zoltick et al., 2024).

This state of chronic stress has devastating long-term consequences, crippling the immune system and disrupting the cow's internal balance. A repercussion is reproductive failure, as the hormonal chaos prevents normal ovulation and conception, illustrating a fundamental compromise of the animal's biological function and overall welfare (Lavon et al., 2011).

Holistic measures for subclinical mastitis control, such as improved housing in the form of a loose-housing system, scientific milking management, hygienic bedding, unlimited drinking water supply, nutritional protocols, and routine animal care, are inherently welfare-oriented (Bhakat et al., 2020; Kumari, Bhakat, & Singh, 2020; Mullan et al., 2020; Shaikh et al., 2019). Tied-housing systems compromise animal welfare by denying cows access to a clean, dry resting area, a resource they strongly prefer over wet and soiled surfaces.

The Impact of Tied Housing on Animal Welfare and Disease Risk

To provide informed insights into the current discourse on dairy cattle housing, data from multiple international field studies demonstrate the specific pathogen risks associated with tied systems. Researchers in Finland identified a strong correlation between tiestall housing and a higher probability of Staphylococcus aureus, a major contagious pathogen known for causing chronic, persistent infections that are difficult to treat (Taponen et al., 2017). This finding is reinforced by a large-scale Canadian study that reported tiestall barns had a higher prevalence of intramammary infections from several other non-aureus staphylococcal species, compared to loose housing systems (Condas et al., 2017).

The risk is not limited to contagious pathogens. A study of Sicilian herds revealed that cows in tie stalls had the highest prevalence of environmental Streptococcus intramammary infections, a rate considerably greater than that found in loose housing systems (Ferguson et al., 2007). The finding reveals a matter of serious importance, as tethered systems are linked to a higher burden of both contagious pathogens including Staphylococcus aureus and non-aureus staphylococci, which cause chronic, high-SCC infections that are difficult to eradicate, and key environmental pathogens like Streptococcus. Therefore, loose housing offers a better alternative, focused on reducing the reservoirs for both persistent, cattle-to-cattle transmission and environmental contamination. This link between housing and health is also supported by Indian-specific epidemiological data, which found the prevalence of mastitis to be significantly higher in conventional housing systems compared to loose housing systems (Shaikh et al., 2018).

Beyond all other factors, the interlinked relationship between cattle welfare and disease resistance is scientifically well-established, a cornerstone for maintaining low SCC. Tied-housing, a system common across India where animals are tethered, symbolizes a critical concern for animal welfare (Kamboj et al., 2022). This housing method is characterized by extreme restriction of movement, limiting the cows' ability to express normal behaviors like walking, grooming, and socializing (Kamboj et al., 2022; Tarantola et al., 2016).

Therefore, the severe confinement is not just a physical constraint but a source of measurable physiological stress; cows in tied housing display noticeably more salivary cortisol values compared to those in loose housing systems, indicating a compromised welfare state (Tarantola et al., 2016). The lack of opportunity for social behavior is a fundamental welfare limitation, unlike loose housing systems, specifically recognized for allowing animals to experience natural social interactions.

Conclusively, the improvement of an animal's basic health and affective state creates a more robust and resilient cattle with a strengthened capacity to resist infections, including mastitis. To add, By improving farm-level management practices and enhancing the welfare of dairy animal, mastitis can be prevented and controlled. Thus, achieving low SCC is an outcome of proactive management and welfare-centric practices.



2.3 ECONOMIC DRAIN ON THE DAIRY SECTOR

The prevalence of high-SCC milk is a significant financial drain that permeates the entire Indian dairy value chain, undermining the economic viability of both smallholder farmers and industrial processors. The underlying cause, bovine mastitis, inflicts staggering annual losses estimated to be in the thousands of crores of rupees (Bansal, B.K., & Gupta, D.K., 2009; Rai et al., 2022).

These losses begin at the farm level and are both direct and severe. A high-yielding cow suffering from mastitis can experience a 3-4 kg reduction in daily milk yield. At current market rates, this translates into a direct revenue loss of ₹306 to ₹458 per animal, per day. These output losses are compounded by downstream costs, including discarded milk, premature and replacement costs from chronically infected animals from the farm, veterinary expenses for treatment, and increased labor requirements for managing sick animals (DAHD, 2025).

The economic damage does not stop at the farm gate. For the processing industry, high-SCC milk is a substandard raw material that impairs processing efficiency, diminishes the quality and shelf-life of finished products. During mastitis, the infection alters the natural barrier of the udder, allowing substances from the blood to leak into milk. This turns milk into a product of an inflammatory state, reducing safety and quality.

Elevated SCC milk contains markedly lower levels of casein, the primary protein essential for cheese and yogurt production, and a vital source of amino acids for human nutrition. The degradation of casein by enzymes like plasmin leads directly to poor curdling, lowered cheese yield, and a bitter taste in dairy products. It also has reduced levels of lactose and fat, further diminishing its caloric and nutritional value. The milk contains an increased concentration of sodium and chloride, which leak in from the blood (Alhussien & Dang, 2018). This threatens the overall profitability, sustainability, and export competitiveness of India's dairy sector, which is the largest in the world.

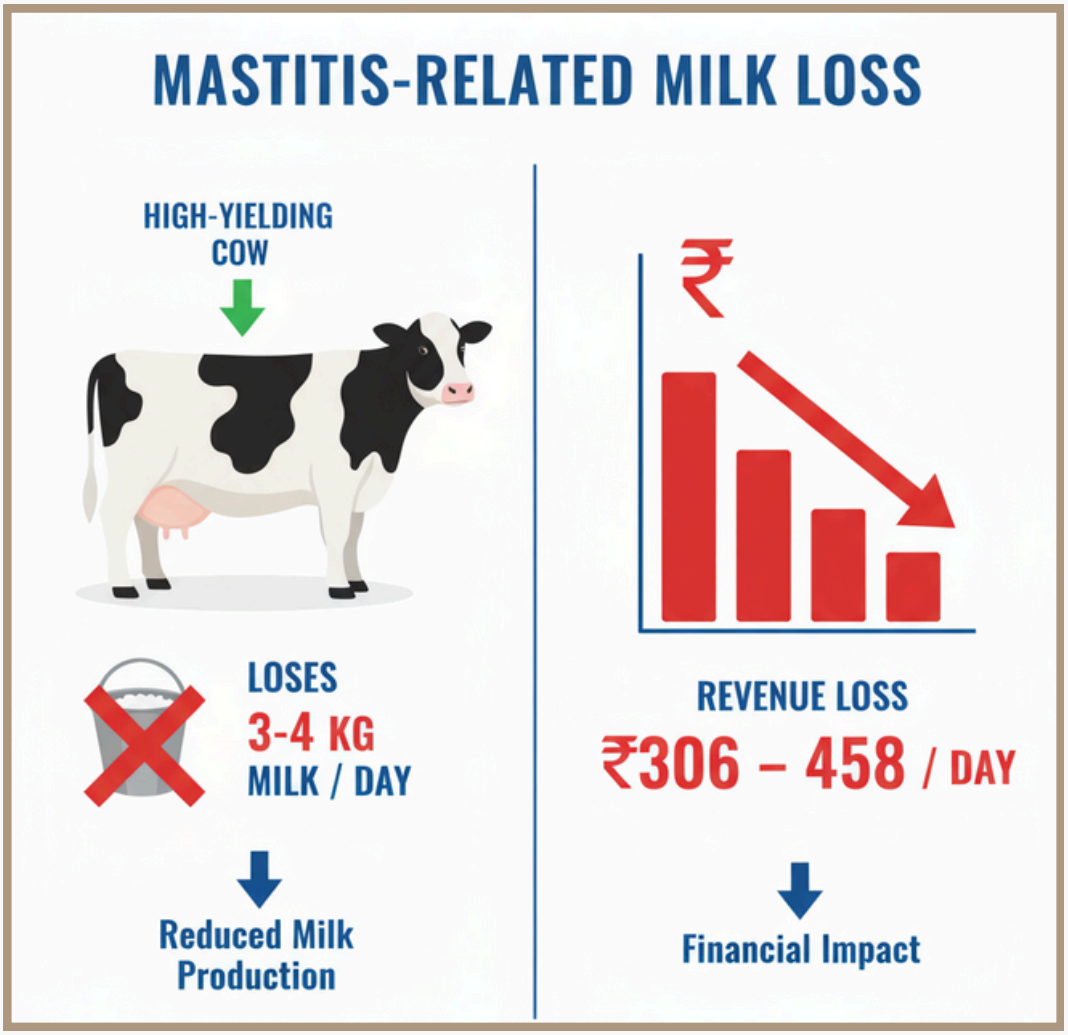
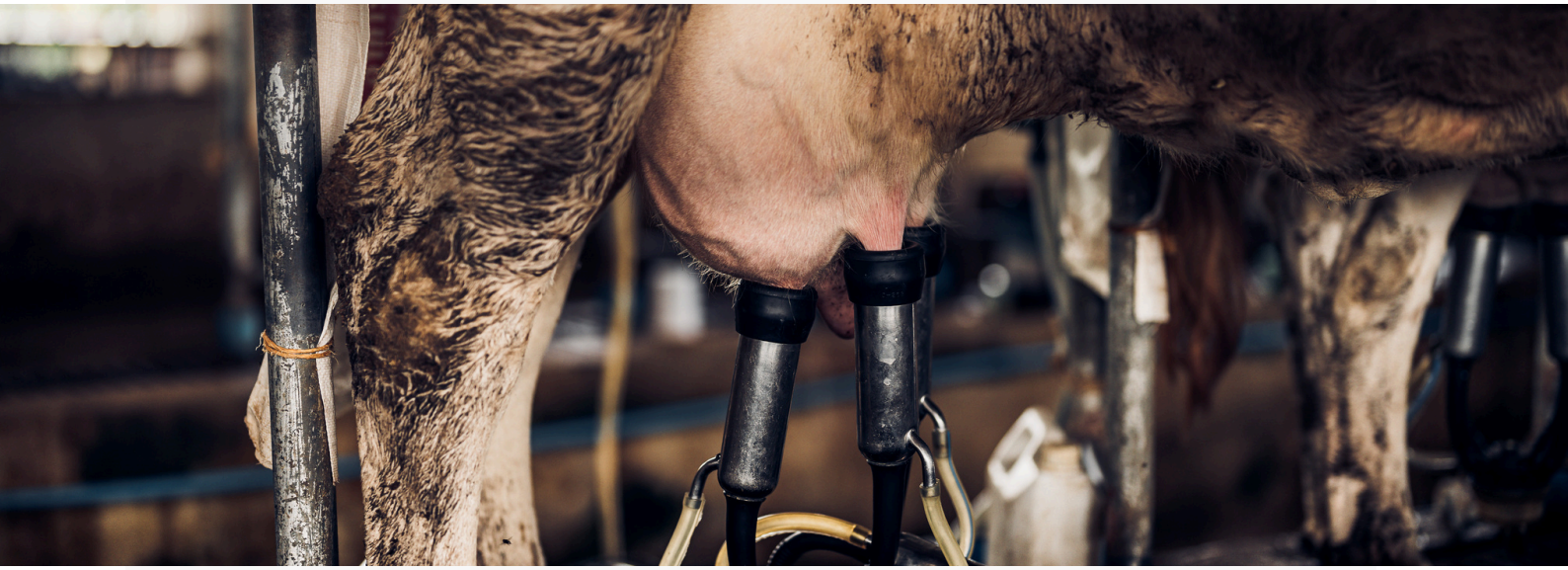


Figure 4. Mastitis toll at the farm-level

3. ONE NATION, ONE DEFINITION AND TWO MILK QUALITIES



3.1 NON-REGULATION OF SCC BREACHES FSSAI'S DEFINITION OF 'MILK'

The existing Food Safety and Standards Authority of India's (FSSAI) framework underlines milk composition, adulteration control, and microbiological safety, but remains silent on SCC as a criterion. The hidden crisis of SCM plainly violates the FSSAI's own definition of milk as *"...the normal mammary secretion derived from complete milking of healthy milch animals"* (FSSAI, 2011). Mastitis renders a milch animal 'unhealthy', which makes it difficult to ensure complete milking, due to the psychological or hormonal response to pain and physical blockage in cattle, which in turn hinders full milk let-down. This calls into question how mastitis-affected secretions from incomplete milking are allowed to be marketed as 'milk'. The high prevalence of SCM in India, devoid of regulation, means that vast quantities of milk from unhealthy animals are openly entering the domestic food supply chain every day, creating a systemic risk that cannot be managed without a mandatory SCC testing standard.

Legal limit (somatic cells per ml)	Nation
750,000 cells/mL	United States
400,000 cells/ml	Canada
400,000 cells/ml	European Union
400,000 cells/ml	UK
400,000 cells/ml	Australia
400,000 cells/ml	New Zealand
500,000 cells/mL	Brazil
350,000 cells	Switzerland
No limit	India

Table 2. The acceptable limits for SCC in bovine raw milk in different countries (Darbaz et al., 2023; Moradi et al., 2021)

The most compelling argument for immediate regulatory action is the existence of a stark and indefensible double standard within India's own regulatory framework: one standard for milk destined for export markets and another, or rather, a complete lack of one, for the milk consumed by our citizens. According to the Export Inspection Council of India (EIC), cow milk intended for exportation must have an SCC level that does not exceed 4,00,000 cells/mL (EICI, 2022). In stark contrast, there is no such legal limit for the regular milk production and supply system within the country. This "regulatory vacuum" permits milk that is deemed unfit for international consumers to be sold freely in the domestic market of India.

3.2 RECOGNITION OF SCC'S RELEVANCE BY STAKEHOLDERS

ICAR-National Dairy Research Institute (ICAR-NDRI), the nation's premier dairy research institution, is running a Department of Biotechnology (DBT) project to generate milk somatic cell reference values and create intelligent predictive models for monitoring the mammary profile and milk quality of indigenous dairy animals.

Government agencies like National Dairy Development Board (NDDB) and Bureau of Indian Standards (BIS) have created metrics for SCC monitoring as a requirement within voluntary certification schemes (NDDB, 2019; BIS, 2022). NDDB, through its *"Quality Mark"* initiative, focuses on improving food safety and quality in the dairy sector. Under this initiative, there is a requirement for testing raw milk for "Somatic Cell Counts" as a "Major" assessment parameter (with a minimum of 85% compliance). NDDB claimed to actively work across different states to reduce high SCC via detection and control of SCM at the farm level through the Mastitis Control Popularization Project (Rana, 2017).

BIS, through its *"Conformity Assessment Scheme for Milk and Milk Products,"* cites a requirement for testing raw milk for SCC as a "Major" assessment parameter, but without a numerical limit. This scheme aims to facilitate single-point certification of milk & milk products for the benefit of the Indian dairy sector and consumers. While these metrics with testing opportunities exist, NDDB and BIS initiatives are voluntary in nature, posing challenges in extensive implementation.

The key Indian regulatory authorities acknowledge the importance of SCC for imported genetics (Department of Animal Husbandry and Dairying [DAHD], 2024) and note for consideration of niche products (FSSAI, n.d.). However, there is no SCC regulatory limit for the domestic market.

As a result, a system of "two milk qualities" exists: a high-quality, low-SCC supply for export and premium markets, and an unregulated supply of unknown quality for the vast majority of Indian consumers, as encapsulated in the table below.

Indian Regulatory Authorities	References to SCC	Contextual Acknowledgement of SCC
Export Inspection Council (EIC), Ministry of Commerce and Industry, Government of India	*"Executive Instruction For Export Of Milk & Milk Products(2022)"* (Requires Milk for Export (Limit to be 400,000 cells/mL)	SCC is acknowledged as a critical food safety and quality parameter specifically for raw cow's milk. The document sets a clear, mandatory quantitative limit of 400,000 cells per milliliter for raw cow milk, calculated as a rolling geometric average over three months.
Department of Animal Husbandry (DAHD), Ministry of Fisheries, Animal Husbandry & Dairying, Government of India	*"Guidelines for Export and Import of Bovine Germplasm(2024)"* (Requires meeting exporting country's SCC standards) *"Strategy Document on the Prevention and Control of Mastitis"* (Implies milk >200,000 cells/mL is infected)	The DAHD mandates that imported bovine genetics must meet the SCC standards of the exporting country, an acknowledgment of SCC as a key indicator of genetic quality (DAHD, 2024). Yet, it does not apply these same standards to the milk produced by the offspring of these animals for consumption by Indian citizens.
Food Safety & Standards Authority (FSSAI), Ministry of Health and Family Welfare, Government of India	*"Guidance on Donkey Milk"* (Acknowledges low SCC as a marker of high quality)	The FSSAI recognizes SCC as a critical quality benchmark in its guidance for an unlisted food item like donkey milk but maintains a "regulatory silence" for bovine milk.

Table 3. Regulatory Landscape for Somatic Cell Count Standards in India

The absence of a domestic SCC standard is not due to scientific ignorance or technical incapacity of India's key regulatory bodies. On the contrary, an analysis of their existing policies and programs exposes a policy anomaly: these institutions recurrently recognize world-class SCC standards, but only in specific, isolated contexts owing to export-related commercial pressures or specialized applications through voluntary certifications. This demonstrates that the failure to regulate SCC for the domestic market is a clear policy choice, not a knowledge gap.

Any discussion on the feasibility of a nationwide SCC standard invites concerns about the practicality of mass-scale testing. However, Somatic Cell Counting is not a niche or experimental procedure to begin with. Somatic Cell Counting is, in fact, one of the most frequently performed tests worldwide, estimated at over 500 million tests/year. Milk SCC is globally used in food legislation, milk payment testing, farm management, and breeding programmes (International Dairy Federation, 2024).

4. SCC: CURRENT TESTING LANDSCAPE

The challenge of implementing a national SCC standard is not one of technological availability but of scale and accessibility. The methods for accurately measuring SCC are well-established, ranging from high-precision laboratory analysis to simple on-farm screening tools. Among the standard methods currently used to measure SCC, two of them are supported by International Standards Organization (ISO) standards (International Dairy Federation, 2013).

The first reference method is the Direct Microscopic Somatic Cell Counting (DMSCC), which is based on ISO 13366-1/IDF 148-1: 2008. DMSCC is the most common SCC testing method in National Accreditation Board for Testing and Calibration Laboratories (NABL)-accredited labs in India. However, the most commonly used automated method in the world is based on fluoro-opto-electronic instruments, which operate under ISO 13366-2:2006/IDF 148-2: 2006. This is the only standardized automated method, and it is estimated that 85% of the world's milk supply is tested using this principle. Besides the ISO-standardized methods, a portable Lactoscan (Charge Coupled Device (CCD) camera technology) for estimating milk SCC has been developed by many companies, which uses a sensitive fluorescent dye for capturing to make the cell analysis more accurate, reliable, and fast. This is particularly useful at the farm level or in laboratories that process a smaller volume of samples.

The Union Department of Animal Husbandry and Dairying under the Ministry of Fisheries, Animal Husbandry & Dairying's draft "Strategy Document on the Prevention and Control of Mastitis" recommends the California Mastitis Test (CMT) as a simple, affordable, and effective on-farm tool for the early identification of mastitis by measuring SCC (DAHD, 2025). The CMT has low sensitivity and specificity and, therefore, “cannot be used for accurate and reliable estimation of the cell count”. It should therefore be viewed as a preliminary screening tool rather than a definitive quantitative measurement.

This existing landscape confirms that the implementation of an SCC standard is not constrained by a lack of viable testing options but rather by the need for a structured policy to deploy these tools effectively and affordably across the dairy value chain.

5. REGULATED SCC SPILLOVER EFFECT: INDIA'S DUAL DAIRY MARKET

In 2023-24, India's milk production stood at 239.3 million metric tonnes (MMT), representing 25% of global production. About 88 MMT (37%) was consumed at the producer level, leaving a marketable surplus of 150 MMT. Of this surplus, only 32% (47 MMT) is handled by the organized sector, while the remaining 68% (102 MMT) is in the unorganized sector. The cooperative sector accounts for 56% (26 MMT) of milk handled in the organized segment (Press Information Bureau, 2024). This means the traditional milk supply chain (local vendors, milkmen, and direct producer-to-consumer sales) handles more than double the volume of the entire organized sector combined.

Although nationally representative data on dual-market participation are lacking, studies from leading milk-producing states confirm that many Indian dairy farmers engage with both organized and unorganized sectors to different extents. This can be attributed to a variety of factors: better prices and immediate cash from informal sales, diversifying their outlets to mitigate market risks, access to non-price benefits like veterinary care from cooperatives, and navigating on-farm logistical constraints (Kumar et al., 2018; Lakshmipriya et al., 2019; Priscilla et al., 2017; Singh, 2018; Yadav et al., 2025).

Notwithstanding, since the same producers are supplying both channels, this presents an opportunity wherein standards enforced in the formal market can develop quality improvement in the traditional supply chain.

While the unorganized dairy sector may not directly come under the purview of regulation for SCC levels, the establishment of a national SCC limit would have benefits that trickle down to improvements in milk quality for producers that supply to both organized and unorganized sectors, thereby creating a positive spillover effect in the entire dairy ecosystem, including unorganized farmers.

For instance, supposing the dual-market-participating farmer is encouraged to improve the herd health to be acceptable within a regulatory limit (in the formal market), a market-wide improvement in milk quality (with a lower pathogen load, fewer inflammatory by-products, and a better nutritional profile) can percolate into the unregulated, unorganized sector, even before household boiling.

Thus, through a national SCC standard, the quality gap can be bridged between the organized and unorganized sectors. The higher standard becomes the new baseline for the entire farm's output, regardless of its end point, ultimately upholding consumer confidence.

6. POLICY RECOMMENDATIONS

1. **Mandate a National SCC Limit:** FSSAI should establish mandatory SCC limits for milk under the *Food Safety and Standards Regulations, 2011.* This should include differentiated standards for cows, buffaloes, and other milch animals reared for dairy purposes.
2. **Conduct a National SCC Surveillance Study:** FSSAI should investigate the prevalence, regional distribution, and food safety implications of high SCC milk on elevated SCC in its upcoming national milk surveys. The findings will be helpful to map the prevalence and regional distribution of high SCC milk and design targeted interventions.
3. **Modernize On-Farm Mastitis Detection:** The Department of Animal Husbandry and Dairying, with the assistance of ICAR-National Dairy Research Institute, should lead the transition from the subjective California Mastitis Test (CMT) to more reliable and quantitative diagnostic methods, such as enzyme-based assays. This will empower farmers with accurate tools for early detection and management.



4. **Strengthen Farmer Training and Capacity Building:** Dairy co-operative societies, in collaboration with premier institutions like the National Dairy Research Institute and the NDDB, should develop and implement robust training programs. These programs should focus on incorporating welfare-oriented, scientific management practices such as udder health, hygiene, nutrition, loose housing, and providing ready access to water, so as to lower SCC levels at the farm level.

5. **Align with Global Standards through the Bureau of Indian Standards (BIS):** BIS can undertake to harmonize Indian standards with the regulatory and quality control testing of SCC in milk as defined by the ISO 13366 series (IDF 148), which specifies the microscopic reference method and guidance for the operation of automated fluoro-opto-electronic counters.

6. **Comprehensive Risk Assessment With Elevated SCC:** ICMR-National Institute of Nutrition (premier Indian research institute focused on public health and nutrition)and CSIR - Central Food Technological Research Institute (leading food science and technology institute) should conduct a comprehensive risk assessment quantifying the adverse public health implications, including poor nutritional quality and the presence of veterinary drug residues, associated with high SCC milk consumed in India. This can be helpful towards improving milk quality and protecting the health of Indian consumers.



7. CALL FOR A NATIONAL SCC LIMIT



The establishment of a mandatory Somatic Cell Count standard is not a liability but a strategic and essential investment in the future of the Indian dairy industry. It is a policy that cuts across simple regulation, offering a clear path toward a safer, more humane, and more prosperous dairy sector.

By setting a national SCC limit, India could protect the health of 1.4 billion citizens by ensuring the milk they consume is safe, wholesome, and free from the risks of infection and contaminants. It will also uphold the welfare of the nation's dairy animals, thereby reducing the silent suffering of millions and promoting more humane and sustainable farming practices. In the end, it will secure the economic future of the world's largest milk-producing nation by improving efficiency, enhancing product quality, and boosting the incomes of farmers and the profitability of the entire industry.

By closing the existing regulatory gap and aligning domestic standards with global benchmarks, we can elevate the Indian dairy sector to a world-class standard of safety, quality, and sustainability for the benefit of all.

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Plot No. 26, D.D.A. Opp Gulmohar Enclave Gate No. 3, New Delhi - 110049

+91 88262 89111

sunayana@pfappf.com

Written by: Balaga Sai Sanjit