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HEALTH
Benefits of A2 Milk

Strong Teeth
Milk is the best source for calcium and that's exactly what your teeth need. In addition, milk helps prevent cavities and tooth decay.

Healthy Bones
It's true that kids need to drink milk to increase bone health, in order to improve proper growth.

Weight Loss
Studies have proven that women who drink milk daily are more likely to lose weight than women who do not drink milk.

Reduce Stress
Sit down and drink a warm glass of milk. This helps to relieve muscle tension and soothe your nerves.

Energy Booster
When you're struggling to get through the day and you need a little pick-me-up, reach for an ice cold glass of milk. You will feel revitalized in no time.

BENEFITS OF DRINKING MILK

Calcium for strong bones

Protein for muscles

Vitamin D for absorption

Phosphorus for growth

Hydrates with nutrients

Potassium for heart health

From the Pen of Chief Editor

Editorial | Summer Stress Management: Protecting Productivity in Rising Temperatures

As summer intensifies across the country, the dairy sector once again faces one of its most predictable yet challenging adversaries — heat stress. While seasonal fluctuations are a natural part of livestock production, rising temperatures, coupled with increasing humidity and erratic weather patterns, are making summer stress management more critical than ever.

Heat stress is not merely a matter of animal discomfort. It directly affects feed intake, milk yield, fertility, immunity and overall herd performance. Even a marginal drop in dry matter intake during peak heat can translate into significant production losses over weeks and months. For high-yielding animals, the impact is even more pronounced, as their metabolic heat load is already elevated.

Effective summer management begins with infrastructure readiness. Adequate ventilation, scientifically designed sheds, ridge ventilation systems, foggers and sprinklers are no longer optional investments — they are essential tools for sustaining productivity. Clean drinking water availability must be ensured round the clock, with regular monitoring of water temperature and quality. In many regions, increasing the number of water points has shown measurable improvements in herd comfort and intake.

Nutritional strategies also demand adjustment during summer. Ration balancing with higher energy density, incorporation of buffers, yeast cultures and mineral mixtures can help mitigate metabolic stress. Feeding during cooler hours — early morning and late evening — encourages better consumption and rumen stability.

Equally important is proactive health monitoring. Summer often brings a rise in mastitis, parasitic load and metabolic disorders. Regular herd checks, vaccination schedules and hygiene protocols must be reinforced. Technology — from automated temperature sensors to herd monitoring software — is emerging as a valuable ally in early detection of stress indicators.

However, beyond technical measures lies a broader responsibility. Climate variability is becoming a long-term reality. As an industry, we must invest in climate-resilient infrastructure, research heat-tolerant genetics and promote farmer awareness at the grassroots level.

Summer stress management is not a seasonal checklist — it is a strategic commitment to animal welfare, farmer profitability and sustainable dairy growth. The farms that prepare today will be the ones that sustain productivity tomorrow.

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ARTICLE

Artificial Intelligence in Livestock Management

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Introduction

Artificial Intelligence is transforming traditional livestock farming into a data driven, precision oriented industry. By integrating machine learning , computer vision, Internet of Things (IoT) sensors, robotics, and edge computing, AI enables real-time monitoring, predictive analytics, automated decision support, and optimization of animal health, welfare, and productivity. AI in livestock is central to Precision Livestock Farming a holistic approach to sustainable animal agriculture.

1. Core Technologies in AI-Driven Livestock Systems

1.1 Machine Learning and Predictive Modeling

Machine learning algorithms analyze large datasets collected from livestock including health records, feeding patterns, and environmental parameters, to forecast disease outbreaks, stress events, and productivity drops. Such predictive analytics allow producers to shift from reactive to proactive management, reducing losses and optimizing outcomes.

1.2 Computer Vision and Behavior Analytics

AI-enabled computer vision systems, powered by deep learning models such as CNNs (Convolutional Neural Networks), process video streams from cameras placed across farms to detect subtle behavioral changes like altered posture, movement, or feeding trends that often signal early health issues. A recent multimodal vision framework demonstrated accurate behavior classification (e.g., grazing, running, standing) without invasive tagging.

1.3 IoT Sensors and Real-Time Data

Wearable tags and environmental sensors continuously collect data on vital parameters such as temperature, heart rate, rumination, and barn conditions. When linked with AI, these sensors provide actionable alerts for abnormal readings, enabling immediate intervention. A hybrid AI IoT model improved health monitoring accuracy in dairy cows through real-time analytics.

1.4 Robotics and Automation

AI integration with robotics including autonomous feeders, barn cleaning robots, and robotic milking systems reduces labor requirements and ensures precision in routine tasks while maintaining consistent animal care standards.

2. Practical Applications of AI in Livestock Management

2.1 Early Disease Detection

AI tools detect early disease signs before visible symptoms emerge. For example, deep learning models trained on thermal imaging and movement data can identify Foot and Mouth Disease and mastitis, enabling timely veterinary intervention and reducing spread.

2.2 Health and Welfare Monitoring

Continuous analytics on animal behavior, vocalizations, and physiological signals allow farms to monitor welfare. AI systems can identify stress from heat, lameness, or social isolation prompting welfare focused interventions that improve quality of life and productivity.

2.3 Precision Feeding and Nutrition

AI models tailor feeding schedules and nutritional compositions to each animal's needs by analyzing intake, growth rates, and health data. This leads to improved feed conversion ratios, reduced waste, and enhanced cost-efficiency.

2.4 Reproductive and Breeding Management

AI supports reproductive efficiency by detecting optimal breeding windows and predicting fertility status, leading to better reproductive success and genetic selection programs.

3. Benefits of AI Adoption

3.1 Enhanced Efficiency and Productivity

AI enables farmers to make faster, more accurate decisions, reducing downtime and inefficiencies. Predictive analytics cut costs associated with disease treatment and resource waste.

3.2 Improved Animal Welfare

Continuous monitoring systems ensure animals receive immediate attention in case of distress, minimizing suffering and enhancing overall well-being. Objective welfare metrics also support ethical farming and consumer trust.

3.3 Environmental Sustainability

AI systems optimize feed usage, reduce methane emissions with efficient feeding plans, and improve barn climate control, contributing to lower environmental impact and resource use.

4. Challenges and Ethical Considerations

4.1 High Implementation Cost and Technical Barriers

Adopting AI requires investment in hardware, software, connectivity, and training. Farmers in low-income regions may face economic exclusion without supportive policies.

4.2 Data Privacy and Infrastructure Issues

Extensive data collection raises privacy and cybersecurity concerns, while reliable internet and cloud connectivity remain problematic in rural locations.

4.3 Ethical Implications and Human–Animal Relations

AI systems must be designed to complement, not replace, human care. Concerns include reduced human–animal interaction and decision transparency. Explainable AI frameworks are being developed to ensure farmers understand machine decisions.

4.4 Model Transparency ("Black Box" Problem)

Complex AI models often lack interpretable reasoning, making validation or error-trace analysis difficult. Research in explainable AI aims to address this gap.

5. Future Prospects

5.1 Explainable and Trustworthy AI

Emerging research focuses on explainable AI (XAI) that provides transparent outputs to support farmer trust and adoption.

5.2 Integration With National Innovation Programs

Large-scale research initiatives are underway to develop early-warning AI technologies for livestock health and sustainability under national agriculture and innovation funds.

5.3 Expansion of AI Across Species and Regions

AI applications are extending beyond cattle to sheep, pigs, poultry, and small-scale farming contexts, including noninvasive biometric identification using vein patterns for pigs.

Conclusion

Artificial Intelligence is not merely an add-on but a foundational technology reshaping livestock management into a more efficient, predictive, and welfare oriented industry. While challenges like cost, infrastructure, and ethical considerations remain, ongoing research and policy support are steering the sector toward a future where AI amplifies animal health, productivity, sustainability, and farmer livelihoods globally.

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Disease Prevention in the Dairy Industry: A Strategic and Systematic Approach

By

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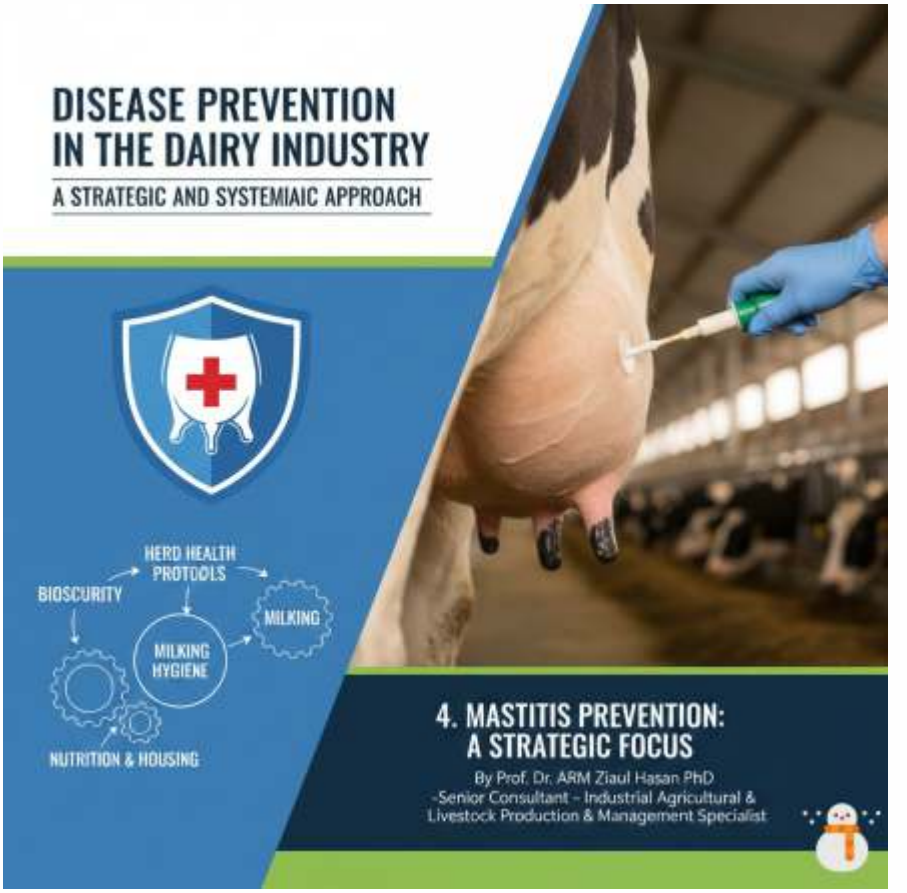
Introduction

Disease prevention in the dairy industry is not a veterinary issue alone — it is a strategic business priority. Modern dairy farming operates under increasing pressure from productivity demands, antimicrobial resistance concerns, climate variability, biosecurity risks, and global trade standards. Preventive health management directly influences milk yield, reproductive efficiency, longevity, animal welfare, and farm profitability.

This article presents a structured, systems-based approach to disease prevention in dairy operations, integrating biosecurity, housing design, nutrition, vaccination, monitoring systems, and data-driven management. The objective is clear: shift from reactive treatment models to proactive prevention systems that protect herd health and economic sustainability.



Introduction: Why Prevention Is a Strategic Imperative

Dairy farms lose substantial revenue annually due to preventable diseases such as:

- Mastitis
- Lameness
- Metabolic disorders
- Reproductive infections
- Respiratory diseases
- Calf morbidity

The true cost of disease is often underestimated. It includes:

- Reduced milk production
- Veterinary expenses
- Drug residues and withdrawal losses
- Increased culling rates
- Fertility delays
- Labor inefficiencies

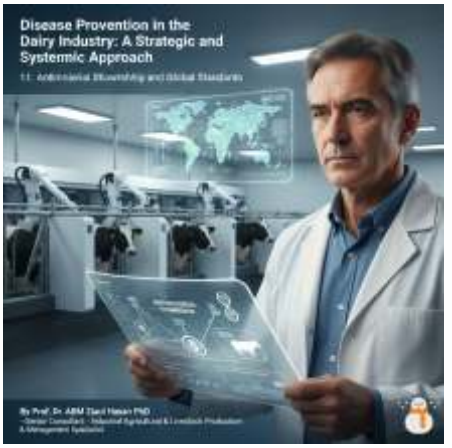
Reactive treatment is expensive. Preventive systems are economically superior.

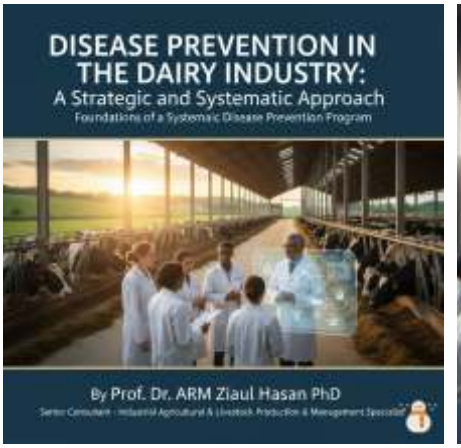
A well-structured disease prevention strategy can reduce herd health costs by 20–40% while improving production efficiency.

2. Foundations of a Systematic Disease Prevention Program

Effective disease prevention in dairy farming rests on five core pillars:

1. Bio security
2. Environmental Management
3. Nutritional Strategy





4. Reproductive and Calf Health Programs
5. Monitoring and Data Analytics

These pillars must function as an integrated system, not isolated actions.

3. Bio security: The First Line of Defense

Bio security is frequently underestimated. Many farms implement

partial measures but lack systematic control.

External Bio security

Prevents introduction of pathogens from outside sources.

Key measures:

- Controlled farm entry points
- Visitor protocols and protective clothing
- Vehicle disinfection
- Quarantine for purchased animals (minimum 30 days)
- Health certification before herd introduction

Introducing a single infected cow can compromise the entire herd.

Internal Bio security

Prevents spread within the herd.

Key measures:

- Segregation of sick animals
- Separate calving areas
- Dedicated equipment for hospital pens
- Proper manure management
- Controlled animal movement between groups

Poor internal bio security is a major cause of contagious mastitis and calf diarrhea outbreaks.

4. Mastitis Prevention: A Strategic Focus

Mastitis is the most costly disease in dairy production.

Economic Impact Includes:

- Reduced milk yield
- Discarded milk
- Treatment costs
- Increased somatic cell count (SCC) penalties
- Premature culling

Prevention Strategy:

- Proper milking hygiene
- Pre- and post-milking teat disinfection
- Regular milking machine maintenance
- Dry cow therapy protocols
- Clean, dry bedding systems

Environmental mastitis is often linked to poor housing design and wet bedding.

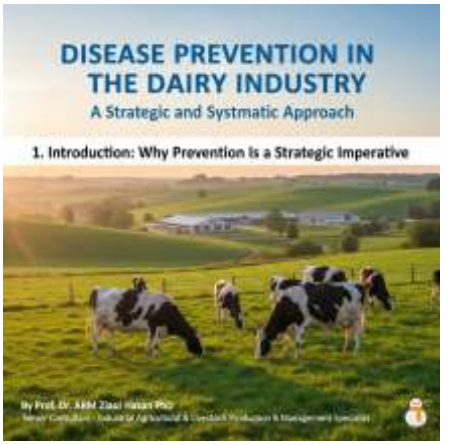
Strategic mastitis control can reduce clinical cases by 50% or more.

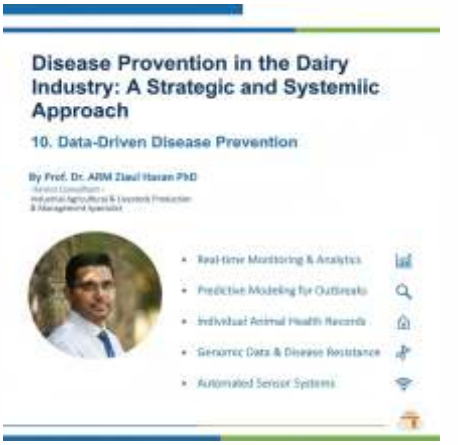
5. Nutritional Management as Preventive Medicine

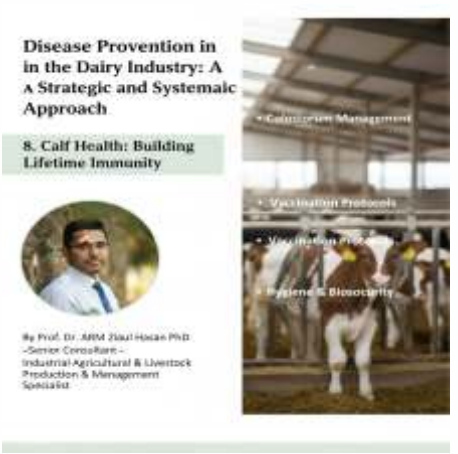
Many diseases originate from nutritional imbalance rather than infectious agents.

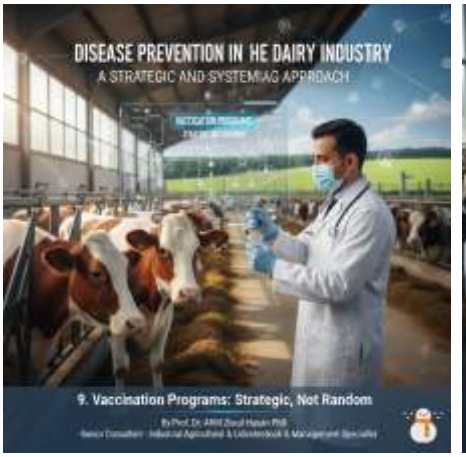
Common Nutrition-Related Disorders:

- Ketosis
- Milk fever (hypocalcemia)
- Acidosis
- Fatty liver syndrome









- Displaced abomasum

Prevention requires:

- Balanced transition cow diets
- Controlled energy intake pre-calving
- Adequate fiber structure
- Proper mineral balance (Ca, Mg, P)
- Monitoring body condition score (BCS)

The transition period (3 weeks pre- and post-calving) determines the health trajectory of the lactation cycle.

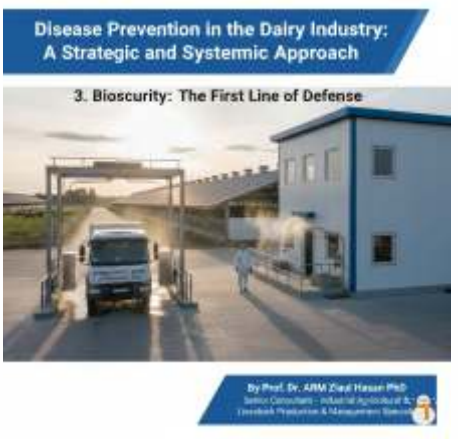
Poor transition management equals higher disease incidence.

6. Housing and Environmental Disease Control

Ventilation, stocking density, flooring, and bedding directly influence disease risk.

Key Risk Areas:

- High humidity and ammonia → respiratory disease
- Slippery floors → lameness
- Overcrowding → stress and immunosuppression



- Wet bedding → mastitis

Preventive housing strategies:

- Proper airflow design
- Adequate lying space
- Non-slip flooring
- Regular bedding replacement
- Shade and heat mitigation in hot climates

Environmental stress weakens immunity and amplifies disease susceptibility.

7. Reproductive Health Management

Reproductive diseases often go unnoticed until fertility declines.

Common problems:

- Metritis
- Retained placenta
- Endometritis
- Ovarian cysts

Prevention strategies:

- Clean calving environments
- Assisted calving hygiene protocols
- Postpartum health monitoring
- Early detection of uterine infections
- Balanced mineral nutrition

Each missed estrus cycle represents economic loss.

Reproductive monitoring systems significantly improve conception rates.

8. Calf Health: Building Lifetime Immunity

Calf mortality and morbidity undermine herd sustainability.

The most critical preventive measure:

Colostrum Management

- Administer within 2 hours of birth
- Ensure adequate volume (10% of body weight)
- Test quality using colostrometer or Brix refractometer

Common calf diseases:

- Diarrhea
- Pneumonia
- Navel infections

Preventive steps:

- Clean calving pens
- Dry bedding
- Proper ventilation without drafts
- Individual housing during early life

Healthy calves become high-performing dairy cows.

9. Vaccination Programs: Strategic, Not Random

Vaccination should follow risk assessment, not habit.

Programs must consider:

- Regional disease prevalence
- Farm history
- Production system
- Herd size

Common vaccines target:

- Brucellosis
- Foot-and-mouth disease
- Infectious bovine rhinotracheitis (IBR)
- Bovine viral diarrhea (BVD)
- Leptospirosis

Improper timing or storage reduces vaccine efficacy.

Vaccination is a preventive investment, not a guarantee without management support.

10. Data-Driven Disease Prevention

Modern dairy farms must use data analytics.

Monitoring indicators:

- Somatic cell count
- Milk yield trends
- Reproductive intervals
- Body condition score
- Feed intake
- Mortality rates

Precision livestock technologies allow:

- Early disease detection
- Activity monitoring
- Rumination tracking
- Automated health alerts

Prevention becomes predictive rather than reactive.

11. Antimicrobial Stewardship and Global Standards

Global dairy markets demand:

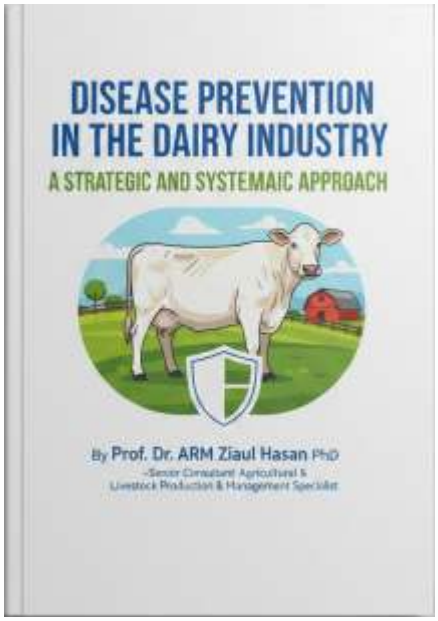
- Reduced antibiotic usage
- Residue-free milk
- Traceability systems

Preventive health reduces dependence on antibiotics.

This improves:

- Export potential
- Consumer confidence
- Regulatory compliance

Sustainable dairy farming requires responsible antimicrobial use.



12. Economic Impact of Prevention

Investment in prevention yields measurable returns:

- Reduced veterinary costs
- Lower culling rates
- Higher milk production
- Improved fertility
- Extended cow longevity

Disease prevention is not an expense — it is a profitability multiplier.

13. Strategic Recommendations for Dairy Leaders

- Develop written herd health protocols
- Conduct quarterly biosecurity audits
- Implement transition cow monitoring systems
- Train farm staff regularly
- Use herd health data for decision-making
- Collaborate closely with veterinarians and nutritionists

Prevention must be institutionalized, not improvised.

Conclusion

Disease prevention in the dairy industry demands a strategic and systematic approach that integrates biosecurity, nutrition, housing, reproduction, calf care, vaccination, and data-driven monitoring. Farms that rely solely on treatment-based systems face higher costs, reduced productivity, and increased risk.

The future of dairy profitability depends on preventive precision management.

Healthy cows are productive cows.

Productive cows ensure sustainable dairy enterprises.

Here's a professionally formatted reference list for your article “Disease Prevention in the Dairy Industry: A Strategic and Systematic Approach”. I've included peer-reviewed journals, FAO and industry resources, and textbooks widely recognized in dairy health and management. You can add more region-specific references as needed.

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Disease Prevention in Dairy Animals: A Holistic Approach to Herd Health

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Introduction

Dairy animals such as cattle, buffaloes, goats, and sheep play a vital role in global food security and rural economies. Milk and milk products are essential sources of protein, minerals, and vitamins for human nutrition. However, the productivity and longevity of dairy animals are constantly threatened by a wide range of diseases. Disease outbreaks not only reduce milk yield and reproductive efficiency but also increase treatment costs and cause significant economic losses to farmers.

Disease prevention is therefore a cornerstone of modern dairy management. Preventive health care focuses on reducing the risk of disease occurrence rather than relying solely on treatment after illness develops.

Common Diseases Affecting Dairy Animals

Dairy animals are affected by infectious, parasitic, metabolic, and reproductive diseases. Infectious diseases include mastitis, foot-and-mouth disease, brucellosis, bovine tuberculosis, hemorrhagic septicemia, and viral respiratory infections. These diseases spread rapidly within herds if preventive measures are not in place.

Parasitic diseases caused by internal worms and external parasites such as ticks, mites, and lice weaken animals, reduce milk production, and predispose them to secondary infections. Metabolic and nutritional disorders, including milk fever, ketosis, and ruminal acidosis, are commonly associated with poor feeding practices and high production stress.

Principles of Disease Prevention

Effective disease prevention in dairy animals is based on a combination of biosecurity, proper nutrition, vaccination, stress management, and regular health monitoring. These principles work together to strengthen the animal's immune system and reduce exposure to disease-causing agents.

Biosecurity Measures in Dairy Farms

Biosecurity refers to practices designed to prevent the introduction and spread of diseases on a farm. New animals should always be quarantined for at least three to four weeks before being introduced into the main herd. During this period, animals should be observed for signs of illness and tested if necessary.

Farm visitors, vehicles, and equipment can act as carriers of pathogens. Limiting unnecessary

access, maintaining clean footwear and protective clothing, and disinfecting equipment are essential biosecurity practices. Sick animals should be isolated immediately to prevent the spread of infection.

Role of Vaccination in Disease Prevention

Vaccination is one of the most effective tools for preventing infectious diseases in dairy animals. A well-planned vaccination schedule protects animals against common and economically important diseases. Vaccines stimulate the immune system to recognize and fight specific pathogens.

Vaccination programs should be developed in consultation with a veterinarian, taking into account local disease prevalence, age of animals, and production stage. Proper storage, handling, and administration of vaccines are critical to ensure their effectiveness.

Nutrition and Its Impact on Immunity

Balanced nutrition is fundamental to disease resistance. Dairy animals require adequate energy, protein, minerals, and vitamins to maintain a strong immune system. Deficiencies in nutrients such as vitamin A, vitamin E, selenium, and zinc can impair immunity and increase disease risk.

Feed quality should be monitored regularly to avoid contamination with molds and toxins. Clean, fresh drinking water must be available at all times, as dehydration and poor water quality can lead to digestive disorders and stress.

Environmental and Housing Management

Proper housing reduces stress and exposure to pathogens. Dairy sheds should be well-ventilated, dry, and spacious to prevent overcrowding. Good drainage and regular cleaning help reduce the buildup of disease-causing organisms.

Comfortable bedding and protection from extreme weather conditions improve animal welfare and productivity. Heat stress management through shade, fans, and cooling systems is particularly important in hot climates.

Mastitis Prevention and Control

Mastitis is one of the most costly diseases in dairy farming. Preventive measures include maintaining udder hygiene, following proper milking procedures, and ensuring that milking equipment is clean and functioning correctly.

Post-milking teat disinfection, dry cow therapy, and regular screening for subclinical mastitis are effective strategies to reduce its incidence. Chronic cases should be managed carefully to prevent spread within the herd.

Health Monitoring and Record Keeping

Early detection of disease greatly improves treatment success and reduces losses. Farmers should observe animals daily for changes in appetite, behavior, milk yield, and physical appearance.

Maintaining detailed records of health, vaccination, treatments, and production performance helps in identifying trends and evaluating the effectiveness of preventive programs. Good records support informed decision-making and long-term herd health planning.

Role of Farmers and Veterinarians

Disease prevention is a shared responsibility. Farmers play a key role by implementing daily management practices and maintaining hygiene. Veterinarians provide professional guidance on vaccination, diagnosis, and preventive health planning.

Regular training and education of farm workers enhance awareness and compliance with disease prevention protocols, leading to healthier herds and improved productivity.

Conclusion

Disease prevention in dairy animals is essential for sustainable and profitable dairy farming. By focusing on biosecurity, vaccination, nutrition, environmental management, and continuous monitoring, farmers can significantly reduce disease risks.

A preventive approach not only improves animal welfare and milk production but also ensures food safety and economic stability. Adopting comprehensive disease prevention strategies is an investment in the long-term success of the dairy industry.

Low-Cost Feeding Strategies for Smallholder Dairy Farmers

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RAJUVAS jobner

Introduction

Feed costs represent the largest component of total milk production expenses in smallholder dairy systems, particularly in developing countries where livestock are primarily maintained on crop residues and other low-quality roughages. Classical animal nutrition concepts described by D.V. Reddy and McDonald et al. emphasize efficient utilization of locally available feed resources, strategic supplementation, and optimization of rumen microbial activity as cost-effective approaches to improve animal productivity. Recent research has reinforced these principles through on-farm trials and system-based evaluations under smallholder conditions. This review integrates classical nutritional theory with contemporary research findings on low-cost feeding strategies, including crop residue treatment, synchronization of rumen nitrogen and energy supply, green fodder production and conservation, strategic concentrate use, mineral nutrition, and feeding management. The synthesis highlights practical, economically viable feeding interventions that can enhance productivity and profitability in smallholder dairy production systems.

Key words: crop residues, dairy cattle, low-input systems, rumen nutrition, smallholder farming

Introduction

Smallholder dairy farming plays a pivotal role in milk production, food security, and rural livelihoods in developing countries, particularly in India. Despite its socioeconomic importance, productivity in smallholder systems remains low due to chronic nutritional constraints. These constraints primarily arise from dependence on fibrous crop residues, seasonal scarcity of green fodder, and limited access to commercial concentrate feeds. McDonald et al. (2011) characterized such feeding systems as nutritionally imbalanced, typically deficient in fermentable energy, nitrogen, and essential minerals, leading to suboptimal rumen function and poor animal performance.

D.V. Reddy (2011) emphasized that improving the nutritive value and utilization efficiency of existing feed resources is more economical and sustainable than reliance on costly external feed inputs. In recent years, research has increasingly focused on validating these classical nutritional principles under field conditions, demonstrating their continued relevance for low-input dairy systems. This review examines low-cost feeding strategies for smallholder dairy farmers by integrating foundational nutritional concepts with recent scientific evidence.

Crop residues as basal diets in smallholder systems

Crop residues such as wheat straw, rice straw, maize stover, and sorghum stover constitute the basal diet for dairy cattle and buffaloes in smallholder farming systems. According to McDonald et al. (2011), these residues are characterized by low crude protein concentration, high lignin content, and low digestibility, which collectively limit voluntary feed intake and rumen microbial fermentation. D.V. Reddy (2011) reported that animals maintained exclusively on untreated crop residues are often unable to meet even maintenance nutrient requirements, resulting in body weight loss, reduced milk yield, and compromised reproductive performance.

Recent studies continue to confirm that untreated straw-based diets severely restrict productivity, underscoring the need for low-cost interventions aimed at improving the feeding value and utilization efficiency of crop residues in smallholder systems.

Urea treatment of straw

Urea treatment of straw has long been recognized as a practical and economical method for improving the nutritive value of fibrous roughages. D.V. Reddy (2011) described urea treatment as the most feasible chemical method under tropical conditions, as it increases nitrogen content and disrupts lignocellulosic linkages, thereby enhancing digestibility. McDonald et al. (2011) explained that ammonia released during urea hydrolysis causes swelling of plant cell walls, increasing microbial access to structural carbohydrates.

Recent research consistently demonstrates that urea treatment increases the crude protein content of straw from approximately 3–4% to 8–9% and improves dry matter digestibility by 10–15%. On-farm trials in cattle and buffaloes have reported improvements in feed intake, milk yield, and body condition score when urea-treated straw replaces untreated straw in the basal diet. Several studies have also shown that partial replacement of concentrate mixtures with urea-treated straw does not adversely affect production performance, resulting in reduced

overall feed costs. Despite these advantages, adoption remains limited due to labor requirements, water availability, and the need for airtight storage, highlighting the importance of farmer training and extension support.

Synchronization of nitrogen and energy in straw-based diets

Efficient utilization of poor-quality roughages depends on proper synchronization of rumen-degradable nitrogen and fermentable energy. McDonald et al. (2011) emphasized that nitrogen supplementation alone is ineffective unless sufficient readily fermentable energy is available to support microbial growth and protein synthesis in the rumen. In this context, supplementation with fermentable carbohydrate sources such as molasses enhances the efficiency of non-protein nitrogen utilization.

Urea–molasses supplementation strategies have been widely evaluated in tropical feeding systems. Recent studies confirm that inclusion of molasses improves rumen microbial protein synthesis, increases straw intake, and enhances milk production in animals fed straw-based diets. These findings reinforce the classical concept that balanced rumen nutrition, rather than high dietary nutrient density, is the fundamental determinant of performance in low-input dairy systems.

Green fodder production and fodder conservation

Green fodder contributes fermentable energy, protein, minerals, and vitamins to dairy rations; however, its availability in smallholder systems is highly seasonal. D.V. Reddy (2011) highlighted that even small areas devoted to high-yielding fodder crops can substantially reduce dependence on concentrate feeds. Perennial grasses such as Napier–Bajra hybrids and Guinea grass are particularly suitable due to their high biomass yield, adaptability to tropical environments, and ease of management.

Fodder conservation through silage making has been strongly advocated by both D.V. Reddy (2011) and McDonald et al. (2011) as a strategy for ensuring year-round fodder availability. Recent research indicates that inclusion of maize or sorghum silage in straw-based diets improves nutrient intake, milk yield, and feed efficiency while reducing the cost per unit of milk produced. Small-scale silage technologies, including pit and drum silage, have proven feasible under smallholder conditions.

Strategic use of concentrates

Concentrate feeds constitute the most expensive component of dairy rations, and indiscriminate supplementation often reduces farm profitability. Classical feeding standards recommend adjusting concentrate allowance according to milk yield rather than blanket feeding practices. D.V. Reddy (2011) emphasized that low-yielding animals can be maintained primarily on improved roughage-based diets with minimal concentrate supplementation.

Recent field studies support this principle, demonstrating that targeted concentrate feeding based on production level maintains milk yield while significantly lowering feed costs. Furthermore, home-mixed concentrate formulations prepared from locally available ingredients are often more economical than commercial feeds, without compromising nutrient adequacy when properly balanced.

Mineral nutrition in low-cost feeding systems

Mineral deficiencies are widespread in smallholder dairy systems and often limit productivity even when energy and protein requirements are met. D.V. Reddy (2011) emphasized that mineral mixture supplementation represents a small proportion of total feeding costs but yields substantial benefits in terms of milk production, reproductive efficiency, and animal health. McDonald et al. (2011) also highlighted the essential role of minerals in enzymatic and metabolic processes governing nutrient utilization.

Recent research confirms that regular mineral supplementation improves milk yield, reduces the incidence of reproductive disorders, and enhances overall farm profitability, reinforcing the inclusion of mineral mixtures as an integral component of low-cost feeding strategies.

Feeding management and reduction of feed wastage

Efficient feeding management is a cost-neutral strategy for improving nutrient utilization. McDonald et al. (2011) reported that improvements in feeding practices alone can enhance feed efficiency by up to 10%. Practices such as chaffing of fodder, feeding at fixed times, providing continuous access to clean drinking water, and preventing feed spoilage reduce wastage and improve intake. Recent on-farm studies corroborate that such management interventions directly contribute to improved economic returns in smallholder dairy systems.

Conclusion

Low-cost feeding strategies grounded in classical animal nutrition principles and validated by recent research provide sustainable solutions for improving productivity and profitability in smallholder dairy systems. Enhancing the utilization of crop residues through treatment and supplementation, promoting green fodder production and conservation, optimizing concentrate use, ensuring mineral adequacy, and adopting efficient feeding management practices collectively address the major nutritional constraints of low-input dairy production. As emphasized by both D.V. Reddy and McDonald et al., improving the efficiency of available feed resources remains the most economical and practical approach for sustainable smallholder dairy development.

Crimean Congo Hemorrhagic Fever in veterinary public health and epidemiology

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Introduction of CCHF

Crimean Congo hemorrhagic fever (CCHF) is a viral zoonotic disease of major concern in veterinary public health and epidemiology due to its severe impact on human health, its maintenance and spread in animal and tick populations, and its implications for livestock management, occupational safety, and disease surveillance. It highlights the interconnectedness of animal, human, and ecological health, the very essence of the One Health paradigm.

Crimean Congo hemorrhagic fever virus (CCHFV) is a Nairo virus of the Bunyaviridae family. It is one of the most geographically widespread tick borne viral hemorrhagic fevers, endemic in Africa, the Balkans, the Middle East, parts of Asia (e.g., the Indian subcontinent), and regions of Southern and Eastern Europe south of the 50°N latitude.

The virus causes severe hemorrhagic disease in humans with high case-fatality rates often in the range of 10–40% in outbreaks, and even higher in some reports.

Transmission Cycle and Veterinary Relevance

Tick–Animal–Human Cycle

CCHFV circulates in complex ecological cycles involving:

Ticks Primarily Hyalomma species act as both vectors and reservoirs of the virus.

Wild and domestic animals like Cattle, sheep, goats, camels, and certain wild mammals become transiently infected and develop serological markers of exposure without showing clinical disease.

In livestock, CCHFV infection is generally asymptomatic, but animals serve as amplifiers of virus ticks. The virus persists in the host bloodstream for several days post-infection, facilitating subsequent infection of ticks feeding on them.

Serological surveys globally show variable exposure levels in animals, such as high seroprevalence in cattle in parts of Africa, and significant rates among goats and cattle in central India.

Epidemiology and Risk Factors

Occupational & Environmental Exposure

Humans typically acquire CCHF through: Tick bites from infected Hyalomma ticks.

Direct contact with blood or tissues of viremic animals during handling, slaughtering, or butchering.

Nosocomial (health-care associated) transmission via contact with infectious body fluids of patients.

High-risk groups include livestock farmers, veterinarians, abattoir workers, butchers, and health-care workers in endemic regions.

Geographical Spread

CCHF is reported in over 30 countries. The movement of animals, climate change influencing vector distribution, and ecosystem changes contribute to spread and emergence in new areas,

highlighting the need for routine surveillance.

Surveillance and Veterinary Public Health Roles

The veterinary sector plays a critical role in CCHF control and epidemiology:

a. Surveillance in Animals and Ticks

Serosurveillance in livestock provides early indicators of virus circulation before human cases are detected.

Regular tick sampling and pathogen detection help assess risk and inform control measures.

b. Integrated One Health Surveillance

Veterinary authorities must work with public health agencies to report animal exposures, monitor tick populations, and coordinate outbreak responses. Early detection in animals can precede and prevent human cases by guiding interventions.

c. Occupational Health and Safety

- Veterinary public health keeps emphasis on:
- Protective equipment and safe animal handling procedures.
- Training for workers in tick bite prevention and field biosafety.
- Risk communication for high-exposure groups.
- These measures reduce zoonotic spillover into human populations.

Prevention and Control Strategies

Although there are no approved vaccines for animals or humans widely available, prevention focuses on vector and exposure control:

- Tick control on livestock with acaricides and habitat management.
- Quarantine or pre-slaughter pesticide treatment of animals.
- Personal protective measures — long clothing, repellents, gloves for animal handlers.
- Public education for at-risk rural and occupational groups.
- Veterinary public health must champion such integrated preventive measures as part of a One Health framework to reduce both animal and human disease risk.

Challenges and Research Needs

Underreporting and limited diagnostic capacity in low-resource settings.

No specific treatment or universally available vaccine.

Need for molecular epidemiologic studies to understand virus evolution and transmission dynamics among ticks, animals, and humans.

- Future research in veterinary epidemiology and public health is aimed at improved surveillance systems, vaccine development, and integrated vector management strategies.

Conclusion

CCHF underscores the importance of veterinary public health in managing zoonotic threats. Through surveillance of livestock and tick vectors, occupational safety protocols, and collaboration across animal and human health sectors, veterinary epidemiology serves as a frontline defense against this high impact zoonosis. In an increasingly interconnected world, strengthening these systems is essential to prevent and respond to CCHF and similar emerging viral diseases.

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Lumpy Skin Disease: A Threat to Cattle Health and Its Control Measures

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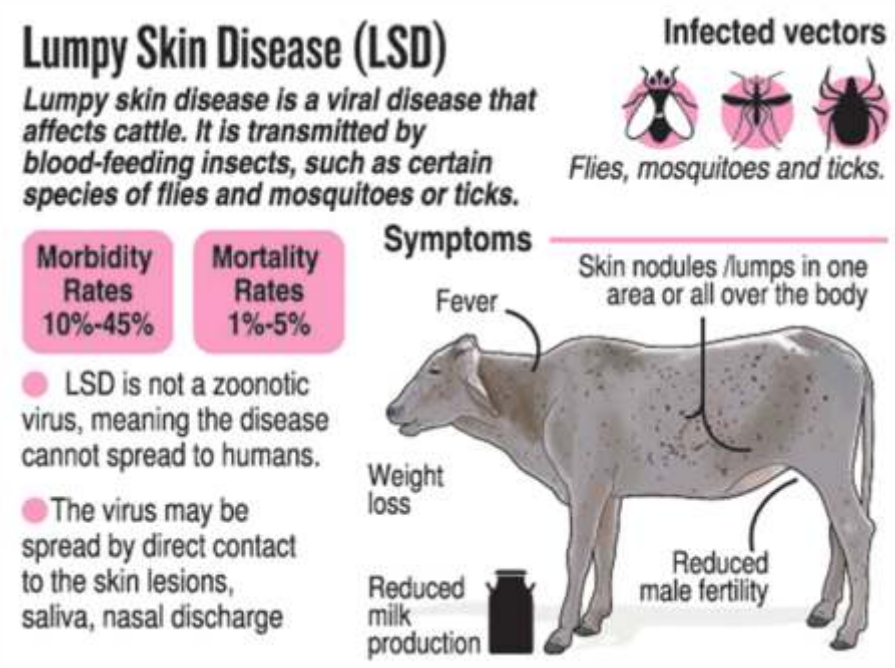
Lumpy skin disease (LSD) is an emerging viral infection of substantial veterinary importance and economic consequence, primarily affecting and water buffalo. Despite the absence of Zoonotic potential, lumpy skin disease imposes significant constraints on livestock production systems, with disproportionate effects in regions where cattle play a pivotal role in food security and rural socio-economic stability. From an economic standpoint, lumpy skin disease represents a significant burden for livestock producers, as infection is frequently associated with transient declines in milk yield, compromised reproductive performance, deterioration of hide quality, and, in severe cases, mortality. First described in Zambia in 1929, the disease remained largely restricted to sub-Saharan Africa for several decades. Over the past few decades, however, lumpy skin disease has exhibited a marked expansion in its geographic range, spreading across the Middle East, Europe, Russia, and Asia, and emerging as a disease of international veterinary concern.

In Asia, the disease has been reported in numerous countries, including India, Bangladesh, China, Nepal, Bhutan, Vietnam, Myanmar, Sri Lanka, Thailand, Malaysia, Laos, and Cambodia, underscoring its capacity for rapid regional dissemination. This unprecedented geographic expansion has elicited



widespread international concern due to its implications for animal health, trade, and livestock-dependent economies. To date, lumpy skin disease has not been documented in the Western Hemisphere, or in Australia or New Zealand.

What is Lumpy Skin Disease?

Lumpy skin disease is an infectious viral disease of cattle. The disease is characterized by high fever and enlarged superficial lymph nodes on the skin and peculiar multiple nodules or lumps on the skin. It can also lead to death, especially in animals that have not previously been exposed to the virus or have low immunity. It is transmitted by blood-sucking insects, such as certain species of flies, mosquitoes and ticks. LSD is a highly host-specific disease. It primarily affects cows and a less extend in buffalo. Morbidity rate is higher in Cattle than Buffalo. It affects calves and heifers more as compared to adult animal in the case of cattle. Some LSDV strains may replicate in cattle and sheep, but till date no epidemiological evidence on role of small ruminants as a reservoir for LSDV has been reported.

Cause:

Lumpy skin disease (LSD) in cattle is caused by lumpy skin disease virus (LSDV), a member of the genus Capripoxvirus within the family Poxviridae. Clinically, the disease is characterized by acute fever and the appearance of numerous well-defined skin nodules.

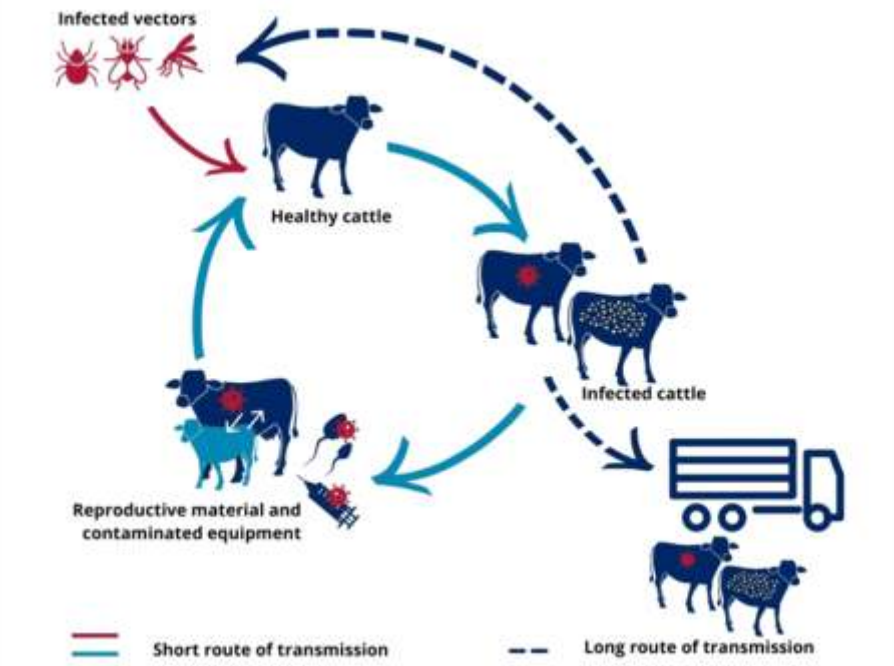
Symptoms

- Initial symptoms - Lachrymation and nasal discharge
- Subscapular and prefemoral lymph nodes become enlarged and are easily palpable.
- High fever (>40.50C) may persist for approximately a week.
- Sharp drop in milk yield.
- Appearance of highly characteristic, nodular skin lesions of 10-50 mm in diameter: The number of lesions varies from a few in mild cases to multiple lesions in severely infected animals. Predilection sites are the skin of the head, neck, perineum, genitalia, udder and limbs. Skin nodules may persist for several months.
- Sometimes, painful ulcerative lesions develop in the cornea of one or both eyes, leading to blindness in worst cases.
- Pneumonia caused by the virus itself or secondary bacterial infections, and mastitis are common complications.
- Infected animals often recover within three weeks of treatment with anti-allergy and antibiotic medicines. The morbidity rate in LSD is 10-20%, while the mortality rate is up to 5%.

Transmission:

Outbreaks of lumpy skin disease virus (LSDV) exhibit a strong association with elevated ambient temperatures and high humidity and occur predominantly during wet summer and autumn periods, particularly in low-lying terrains and areas in close proximity to

water bodies; nevertheless, outbreaks have also been reported during dry seasons. Transmission is mediated primarily by hematophagous insects, including mosquitoes and flies, which function as mechanical vectors, although no single vector species has been conclusively implicated. LSDV has been isolated from Stomoxys spp., Biomyia fasciata, members of the family Tabanidae, Glossina spp., and Culicoides spp., while the relative epidemiological significance of each vector remains to be fully elucidated. Outbreaks are typically sporadic in nature, reflecting the combined influence of animal movement, herd immune status, and climatic variables such as wind and rainfall that modulate vector dynamics. Beyond vector-borne spread, LSDV may be transmitted through direct or indirect exposure to infected biological materials, including blood, nasal and lacrimal secretions, saliva, semen, and milk, with transmission to suckling calves documented. Experimental infection studies have demonstrated the presence of LSDV in saliva approximately 11 days following the onset of fever, in semen at around 22 days, and in skin nodules by 33 days, whereas the virus has not been detected in urine or feces. In keeping with the notable environmental resilience characteristic of poxviruses, LSDV is capable of remaining viable in infected tissues for periods exceeding 120 days.



Diagnosis:

Lumpy skin disease (LSD) is diagnosed using a combination of clinical signs and laboratory methods, including PCR, virus isolation, and serological tests. Initial diagnosis relies on the identification of characteristic symptoms like fever, nodules on the skin, and emaciation, while confirmation requires laboratory techniques to detect the Lumpy Skin Disease Virus (LSDV). A veterinarian may initially suspect LSD based on the animal's appearance, observing symptoms such as fever, depression, and reduced appetite. Skin lesions the development of firm, raised nodules (2–5 cm in diameter) on the skin, particularly on the head, neck, limbs, and udder, is a hallmark sign. These lesions can develop into "sit-fasts" and eventually slough off, leaving ulcers. Other symptoms other signs include rhinitis, conjunctivitis, hyper salivation, swollen lymph nodes, and lameness.

Prevention:

Vaccination using the goat pox vaccine remains the most effective strategy for the prevention of lumpy skin disease. The implementation of stringent farm-level biosecurity measures including restriction of animal movement, avoidance of communal grazing, and the use of insect-proof netting plays a critical role in limiting disease spread. Effective control of arthropod vectors, such as flies, mosquitoes, and ticks, through routine application of insecticidal agents and the use of mosquito nets can further reduce viral transmission. In addition, thorough disinfection of animal housing and surrounding premises contributes to the elimination of environmental viral contamination. Proper disposal of carcasses is equally essential to prevent onward transmission and to contain outbreaks.

Treatment:

Affected animals should be

isolated to prevent further spread.

Symptomatic Treatment:

Fever: Paracetamol can be used to manage fever.

Inflammation: Anti-inflammatory drugs, preferably non-steroidal, can help with inflammation.

Secondary Infections: Antibiotics may be necessary to treat secondary bacterial infections, such as skin or respiratory infections.

Allergic Reactions: Antihistamines can help with allergic reactions.

Supportive Therapy:

Multivitamins: Parental or oral multivitamins can be administered to support the animal's overall health.

Wound Care: Topical antiseptics and fly repellents can be used to clean and protect skin lesions.

Methylene Blue:

A broad-spectrum antiviral agent, methylene blue, can be used orally to help with faster recovery and reduce mortality, according to Acta Scientific.

Ethno-veterinary Medication:

Oral treatment for the first 3 days of infection:

Ingredient	Quantity
Betal leaves	10 nos.
Black Pepper	10 nos.
Crystal Salts	10 grams
Jaggery	required volume

- Proper grinding the above said ingredients, make a paste after adding jaggery in it.
- For first 3 days paste should be fed to affected animals in every 3 hours of interval.
- Feed three dose every three hours for the first day (Day 1)
- From the second day onwards feed three doses daily for 2 weeks (Day 2 onwards)
- Each dose to be prepared freshly

Oral treatment 3 to 14 days of infection:

Ingredient	Quantity
Garlic	2 nos.
Coriander leaves	15 grams
Cumin seeds	15 grams
Holy basil (tulsi)	1 hand full
Clove leaves	15 grams
Black Pepper	15 grams
Betal leaves	5 nos.
Shallots (small onions)	2 nos.
Turmeric powder	10 grams
Neem leaves	One hand full
Jaggery	required volume

- Grind the above ingredients well, mix them up with jaggery
- Feed the paste to the animal in 3 times in a day (morning, evening and night)
- Prepare dose freshly daily

Topical treatment for open wound

Ingredient	Quantity
AcalyphaIndica leaves (Kuppi, Kuppaiment)	One hand full
Garlic tooth	10 nos
Neem leaves	One hand full
Holy basil (tulsi)	One hand full
Turmeric powder	10 grams
Heena leaves	One hand full
Coconut oil	500ml

- Grind the above ingredients and boil them in 500ml coconut oil.
- After cleaning the wound oil should be apply on the

Non-Conventional Milk Sources: Nutritional Attributes and Health Applications

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Introduction

Non-conventional milks from goats, sheep, camels, donkeys, yaks, mithuns and reindeer are gaining attention due to their distinct nutritional composition and functional properties compared with bovine milk. These milks are rich in bioactive components, including lactoferrin, omega-3 fatty acids, essential minerals and low-allergen proteins and have been associated with antimicrobial, antidiabetic, immunomodulatory and cardiovascular benefits. Traditionally important in arid, high-altitude and tribal regions, they offer promising alternatives for individuals with lactose intolerance or milk protein allergy. This review highlights their nutritional attributes, therapeutic potential and emerging applications in functional foods and specialized nutrition.

Key words:
Non-conventional milk; non-bovine dairy; bioactive peptides; camel milk; goat milk; yak milk; mithun milk; therapeutic properties; functional foods; hypoallergenic dairy

Introduction

Milk is defined as the normal lacteal secretion obtained from healthy animals, free from colostrum and containing prescribed levels of fat and solids-not-fat (SNF) (Kober et al., 2024). India is the world's largest milk producer, contributing nearly 25% of global milk output, with total production reaching 247.87 million tonnes in 2024–25 (BAHS, 2025). While cows and buffaloes supply about 95% of this production, milk from non-conventional species such as goats, sheep, camels, yaks, Mithuns and donkeys contributes a smaller yet nutritionally significant share.

Non-conventional milks have long supported food security in regions where conventional dairy farming is constrained by climate, geography, or resource availability. Despite their historical importance, these milk types remain underutilized in mainstream nutrition systems. Recent scientific interest has renewed focus on their unique nutritional composition, bioactive constituents and therapeutic properties, positioning them as promising resources for functional foods and health-oriented nutrition (Wadhwani et al., 2023). This article synthesizes current knowledge on the nutritional composition, health benefits and emerging applications of non-conventional milk sources, emphasizing their relevance beyond conventional bovine milk.

Historical and Cultural Significance

The domestication of dairy animals began thousands of years ago, with goats among the earliest species milked by humans around 8,000–9,000 BCE. Over time, diverse cultures adopted locally adapted species for milk production, shaping regional food systems and dietary traditions. Non-conventional milks have historically sustained populations living in deserts, high-altitude zones and marginal ecosystems where conventional dairy farming is limited or impractical.

Camel milk remains central to the diets of nomadic communities in arid regions due to its hydrating properties and nutrient density. Goat and sheep milk have traditionally supported rural diets across the Mediterranean, Middle East and South Asia, while donkey milk has been used as an alternative to human milk for infants with cow milk protein allergy (Jirillo et al., 2010). In addition to nutrition, these milks have been incorporated into traditional remedies for digestive disorders, skin ailments and metabolic conditions.

In India's northeastern hills, Mithuns (Bos frontalis), descended from the wild gaur, hold significant cultural and socio-economic importance and are closely associated with rituals, ceremonies and social customs

(Dorji et al., 2021). Similarly, yaks (Bos grunniens), domesticated over 5,000 years ago in the Tibetan plateau, remain indispensable to Himalayan livelihoods. Archaeological and proteomic evidence confirms yak milk as a key component of historical high-altitude diets (Miller et al., 2023). These examples highlight the enduring relationship between non-conventional milks, cultural identity and survival in extreme environments.

Comparison with Bovine Milk

Non-conventional milks differ markedly from bovine milk in composition, resulting in distinct nutritional and functional attributes. Variations in protein fractions, lipid profiles, mineral content and bioactive compounds influence digestibility, allergenicity and therapeutic potential. For instance, camel milk lacks β-lactoglobulin, a major allergen in cow milk, contributing to its hypoallergenic nature (Almasri et al., 2024). Goat milk contains lower levels of αs1 casein and smaller fat globules, enhancing digestibility.

Fat and protein contents also vary widely among species. Mithun and yak milk exhibit substantially higher fat and protein levels than cow milk, whereas donkey and mare milk are comparatively low in fat but rich in lactose. Sheep milk stands out for its high calcium and mineral density, supporting bone health. Collectively, these differences indicate that non-conventional milks are not uniform substitutes for bovine milk but represent a diverse group with species-specific nutritional and functional characteristics.

Nutritional Composition of Non-Conventional Milk

The nutritional composition of non-conventional milks reflects species physiology, feeding behaviour and environmental adaptation. Compared with cow milk, several alternative milks show marked differences in macronutrient density and micronutrient content. Sheep milk contains substantially higher fat and protein and is particularly rich in calcium, phosphorus and magnesium (Siddiqui et al., 2024). Camel milk provides comparable protein with lower fat but markedly higher vitamin C and iron levels (Siddiqui et al., 2024; Swelum et al., 2021). Yak and mithun milk are characterized by elevated fat and protein concentrations, resulting in higher energy density, while Mithun milk also exhibits high solids-not-fat content and fat-soluble vitamins (Wang et al., 2023). In contrast, donkey milk contains very low fat and protein but higher lactose and oligosaccharides, contributing to its low allergenic potential (Prasad, 2020).

Beyond basic nutrients, non-conventional milks are distinguished by bioactive components such as functional proteins, essential fatty acids and prebiotic oligosaccharides. These components enhance digestibility and reduce allergenicity, reflecting evolutionary adaptations such as nutrient concentration in cold climates and micronutrient enrichment in arid environments.

- **Proteins, Lipids and Bioactive Components**

  Proteins in non-conventional milks act as precursors for bioactive peptides with antimicrobial, antihypertensive and immunomodulatory properties. Camel milk contains a broader protein spectrum than cow milk, including high levels of lactoferrin and immunoglobulins, contributing to antimicrobial activity (Siddiqui et al., 2024). Goat milk provides comparable protein levels and peptides associated with lipid metabolism and cardiovascular health.

  Lipid composition also varies considerably. Goat milk is rich in short- and medium-chain fatty acids that enhance digestion, camel milk contains higher proportions of mono- and polyunsaturated fatty acids and yak milk supplies conjugated linoleic acid and omega-3 fatty acids (Wang et al., 2023). Oligosaccharides in camel and donkey milk exhibit prebiotic activity, with donkey milk containing sialylated oligosaccharides similar to those in human milk (Prasad, 2020).

Therapeutic Properties and Health Benefits

Non-conventional milks exhibit a wide range of therapeutic properties supported by traditional use and emerging scientific evidence. Camel milk has demonstrated antimicrobial, antidiabetic and immunomodulatory effects attributed to insulin-like proteins, antioxidants and lactoferrin (Anwar et al., 2022). These properties make it a promising dietary adjunct for managing metabolic disorders.

Goat and donkey milk are recognized for their hypoallergenic nature and suitability for individuals with cow milk protein allergy. Goat milk's

fatty acid profile supports digestibility and cardiovascular health, while sheep milk contributes to bone health through its high mineral content. Yak milk provides essential nutrients critical for survival in cold, high-altitude regions. Donkey milk has also gained attention in dermatological applications due to its anti-inflammatory lipids and skin-compatible pH, supporting its use in managing eczema (Aroua et al., 2025). Camel milk has additionally been explored as a complementary dietary intervention in autism spectrum disorder, with reported improvements in behavioural and oxidative stress markers.

Applications in Functional Foods and Pharmaceuticals

The distinctive composition of non-conventional milks has stimulated interest in functional foods, nutraceuticals and medical nutrition. Fermented products such as camel kefir combine probiotic benefits with bioactive compounds, supporting gut health. Bioactive peptides derived from alternative milks are being explored for immune modulation, glycaemic control and chronic disease management. Donkey milk-based infant formulas represent valuable hypoallergenic options for specialized clinical nutrition.

Challenges and Future Prospects

Despite their potential, non-conventional milks face challenges related to limited production, seasonal variability, processing constraints and consumer acceptance. Strong or unfamiliar flavours, particularly in goat and sheep milk, may limit wider adoption. Developing standardized processing methods that ensure safety while preserving bioactive components remains a major challenge.

Future research should prioritize optimized processing technologies, large-scale clinical validation of health claims and improved productivity through genetic and management interventions. Policy support and awareness initiatives could further facilitate integration into mainstream nutrition.

Conclusion

Non-conventional milks derived from goats, camels, yaks and Mithuns offer distinct nutritional and therapeutic advantages over bovine milk. Their richness in bioactive peptides, essential fatty acids and micronutrients supports their role in managing allergies, metabolic disorders, inflammation and oxidative stress. Rooted in centuries-old traditions, these milks remain vital in challenging environments. With growing scientific validation and innovation in functional food development, non-conventional dairy products hold strong promise as sustainable, health-enhancing alternatives for diverse populations.

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Structure and Function of Animal Bodies

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Veterinary anatomy is often described as the backbone of veterinary science. Before a veterinarian can diagnose disease, interpret radiographs, perform surgery, or understand pathology, they must first understand the **normal structure of the animal body**. Unlike human anatomy, veterinary anatomy is inherently **comparative**, because veterinarians work with multiple species that differ widely in size, shape, posture, and function.

From the swift sprint of a dog to the powerful gallop of a horse and the heavy weight-bearing stance of cattle, every movement is governed by anatomical design. The study of anatomy reveals how **bones, muscles, joints, and connective tissues** are adapted to meet the functional demands of each species. This article explores the **comparative anatomy of the musculoskeletal system** in domestic animals and highlights its relevance to veterinary education and clinical practice.

Veterinary Anatomy: More Than Just Naming Structures

Anatomy is not merely the memorization of bones and muscles. It is the study of **relationships, form, and function.** According to Dyce et al. (2017), veterinary anatomy provides the structural framework upon which physiology, pathology, surgery, and clinical medicine are built. Without a sound anatomical foundation, clinical reasoning becomes incomplete.

Veterinary anatomy is traditionally divided into:

- **Gross anatomy –** structures visible to the naked eye
- **Microscopic anatomy (histology) –** tissues and cells
- **Developmental anatomy (embryology) –** structural changes during development
- **Applied or clinical anatomy –** relevance to diagnosis and treatment

Among these, gross anatomy—especially the **musculoskeletal system**—forms the first and most critical learning experience for veterinary students (König & Liebich, 2020).

The Musculoskeletal System: Framework of Animal Life

The musculoskeletal system consists of:

- **Bones** forming the skeleton
- **Joints** connecting bones
- **Muscles** generating movement
- **Tendons and ligaments** providing stability

This system allows animals to stand, walk, run, graze, hunt, escape predators, and interact with their environment. Although all domestic mammals share the same basic skeletal plan, the **size, shape, and orientation of bones and muscles vary greatly** depending on lifestyle and function (Nickel et al., 2004).

Evolutionary Basis of Comparative Anatomy

Comparative veterinary anatomy is rooted in evolution. Animals evolved structural modifications to survive in specific ecological niches. These evolutionary pressures shaped limb length, joint mobility, muscle mass, and bone strength (Hildebrand & Goslow, 2001).

For example:

- **Cursorial animals** (runners) like horses evolved long limbs and reduced digits.
- **Carnivores** like dogs and cats evolved flexible spines and powerful limb muscles.
- **Herbivores** like cattle evolved robust bones to support body weight and prolonged standing.

Understanding these adaptations helps veterinarians interpret why certain species are predisposed to specific musculoskeletal disorders (Dyce et al., 2017).

Anatomy of Carnivores: Dogs and Cats

Skeletal Adaptations

Dogs and cats belong to the order Carnivora and show skeletal features adapted for **speed, agility, and predation**. The vertebral column is relatively flexible, particularly in the lumbar region, allowing rapid acceleration and directional changes (Miller et al., 2018).

Key skeletal features include:

- Reduced or absent clavicle, allowing greater limb mobility
- Well-developed scapula for muscle attachment
- Long limb bones for stride length

Muscular Specialization

Carnivores possess powerful **hindlimb muscles**, including the gluteal and hamstring groups, which generate propulsion during running and jumping. Forelimb muscles assist in braking, turning, and prey capture (Evans & de Lahunta, 2013).

Clinically, this anatomy explains why injuries such as **cranial cruciate ligament rupture** are common in dogs, particularly in large breeds. Knowledge of stifle joint anatomy is essential for surgical repair (Piermattei et al., 2006).

Equine Musculoskeletal Anatomy: Built for Speed and Endurance

Skeletal Design of the Horse

The horse is a classic example of extreme anatomical specialization. Over evolutionary time, horses evolved from multi-toed ancestors to a **single-toed limb**, reducing weight and increasing running efficiency (Hildebrand & Goslow, 2001).

Important features include:

- Elongated metacarpal and metatarsal bones
- Fusion and reduction of lateral digits
- Strong suspensory apparatus supporting the fetlock joint

Muscular System and Locomotion

Equine muscles are arranged to maximize efficiency. Many distal limb muscles are replaced by long tendons, reducing limb weight and energy expenditure during movement (König & Liebich, 2020).

From a clinical perspective, equine veterinarians rely heavily on anatomical knowledge to diagnose **lameness**, tendon injuries, and joint disorders, which are major causes of economic loss in the horse industry (Dyson, 2011).

Bovine Anatomy: Strength and Stability

Skeletal Characteristics

Cattle are heavy animals adapted for grazing and rumination. Their skeletal system emphasizes **strength rather than speed**. Limb bones are thick and strong, and joints are relatively stable with limited range of motion (Nickel et al., 2004).

The vertebral column is designed to support:

- A large rumen
- Prolonged standing
- Slow but continuous movement

Muscular Arrangement

Bovine muscles are more involved in **postural support** than rapid locomotion. Neck and shoulder muscles are particularly well developed to support the head during grazing (Frandson et al., 2009).

Feature	Dog	Horse	Cattle
Digits	5 (functional 4)	1	2
Limb length	Moderate	Long	Moderate
Function	Speed & agility	Endurance running	Weight bearing

Anatomical understanding is crucial in diagnosing **lameness in dairy cattle**, a major welfare and production issue. Subtle changes in posture and gait can indicate joint or hoof pathology (Greenough, 2007).

Comparative Limb Anatomy Across Species

Although dogs, horses, and cattle all possess forelimbs and hindlimbs, their structure varies considerably:

These differences are clinically important. For example, a fracture in a horse's metacarpal bone has different biomechanical consequences compared to a similar fracture in a dog (Dyce et al., 2017).

Applied Anatomy in Veterinary Practice

Role in Diagnostic Imaging

Radiography, ultrasonography, CT, and MRI all depend on anatomical knowledge. Veterinarians must recognize normal anatomical landmarks to identify pathology (Thrall, 2018).

One well-known example is the **Vertebral Heart Score (VHS)** used in dogs to assess cardiac enlargement by comparing heart size to vertebral length (Buchanan & Bücheler, 1995).

Surgical Relevance of Anatomy

Surgery demands precise anatomical understanding. Incorrect identification of muscles, nerves, or blood vessels can lead to serious complications.

Examples include:

- Orthopedic surgery in dogs (TPLO, fracture fixation)
- Tendon repair in horses
- Cesarean section and rumenotomy in cattle

Each procedure relies on species-specific anatomical knowledge (Piermattei et al., 2006).

Teaching Veterinary Anatomy: From Dissection to Digital Tools

Traditionally, veterinary anatomy has been taught through cadaver dissection, which remains invaluable for three-dimensional understanding (König & Liebich, 2020). However, modern education increasingly integrates:

· 3D anatomical models

· Virtual dissection software

· Advanced imaging

Despite technological advances, most educators agree that **hands-on anatomical training** remains irreplaceable (Dyce et al., 2017).

Why Veterinary Anatomy Still Matters

In an era of molecular diagnostics and advanced imaging, anatomy remains fundamental. It connects:

- Structure with function
- Evolution with clinical medicine
- Theory with hands-on practice

Anatomy teaches students to **think spatially,** interpret clinical signs, and understand disease processes in a logical manner.

Conclusion

Veterinary anatomy is the silent language of animal bodies. Every bone, muscle, and joint tells a story of evolution, adaptation, and function. By studying comparative musculoskeletal anatomy, veterinarians gain insight into how animals move, why they suffer certain injuries, and how best to treat them.

From the agile dog to the powerful horse and the resilient cow, anatomy reveals the remarkable diversity of form shaped by nature. For veterinarians, mastering anatomy is not just an academic requirement—it is a lifelong clinical tool that underpins animal health, welfare, and productivity.

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Rice & Grain Expo 2026 Concludes Successfully at Karnal, Showcasing Cutting-Edge Innovations for the Rice & Grain-Processing Industry

Karnal, Haryana, India – February 2026: Agriaxis Expomedia Pvt. Ltd., in association with co-organiser Pixie Expomedia Pvt. Ltd., successfully hosted the much-anticipated **Rice & Grain Expo 2026** from 19th to 21st February 2026 at the New Grain Market, Karnal, Haryana. The three-day mega exhibition emerged as a premier platform for the rice, grain, and food processing industry, bringing together leading companies, technology providers, and industry stakeholders from India and abroad.

The exhibition witnessed enthusiastic participation from a wide spectrum of domestic and international companies, all showcasing their latest machinery, advanced processing solutions, and innovative technologies under one roof. The event was specifically curated to benefit rice millers, flour millers, dal millers, and food processors by exposing them to modern solutions that can enhance productivity, efficiency, and business growth.

Over the course of the event, the expo floor remained vibrant with strong footfall and active business interactions. Visitors from across the country showed keen interest in exploring new-generation equipment, automation solutions, and value-added processing technologies. Many industry professionals expressed that the expo provided them with valuable insights into emerging trends and practical upgrades they can adopt to modernize their operations.

According to the organisers, one of the key highlights of Rice & Grain Expo 2026 was the high level of engagement between exhibitors and visitors. The exhibition successfully created a knowledge-sharing environment where technology providers could directly demonstrate how their solutions can help millers and processors improve output quality, reduce operational costs, and scale their businesses efficiently.

The visitor response remained exceptionally positive throughout the three days. Industry professionals appreciated the opportunity to interact directly with manufacturers and technology

experts, enabling them to make informed decisions for future investments. Many attendees indicated strong intent to adopt the showcased technologies in the coming months to accelerate their business growth and remain competitive in the evolving agro-processing landscape.

Exhibitors also expressed great satisfaction with the quality of visitors and the business enquiries generated during the expo. Several participating companies reported meaningful leads and productive networking opportunities.

Encouraged by the strong awareness and interest among industry stakeholders, many exhibitors have already shown keen enthusiasm to participate in the next edition of Rice & Grain Expo.

Speaking on the success of the event, the organising team from Agriaxis Expomedia Pvt. Ltd. and Pixie Expomedia Pvt. Ltd. reaffirmed their commitment to continuously strengthening the platform and bringing even more advanced technologies and global participation in future editions.

With the resounding success of the 2026 edition, Rice & Grain Expo has further reinforced its position as one of the fastest-growing industry platforms dedicated to the Rice, Grain, and Food processing sector in India.

For next year's edition dates and premium stall booking enquiries, please contact:

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Cheese and Butter Fuel Dairy Export Growth in 2025

ARLINGTON, VA — U.S. dairy export volume and value rose to their highest levels in three years in 2025. Vibrant cheese demand outside the U.S., surging interest in protein, and favorable U.S. commodity pricing helped drive U.S. growth. It was a particularly welcome result given that the year was marked by softer domestic demand, an uncertain tariff climate, heavy second-half global milk production, and, as the year progressed, troublingly low milk prices.

Year-over-year U.S. dairy export volume increased 4% in milk solids equivalent (MSE) terms in 2025, rising to 2.32 million metric tons (MT)—the highest since the 2022 record of 2.41 million MT. U.S. dairy export value gained 15% to $9.63 billion, just shy of the 2022 record of $9.66 billion.

"The gains we saw in exports in 2025 show why international markets are critical to the health and vitality of U.S. dairy farmers, processors and other stakeholders," says Krysta Harden, president and CEO of the U.S. Dairy Export Council (USDEC). "These are challenging times for U.S. dairy farmers, but they would be untenable without the export progress we've made as an industry—and the growth we continue to generate—in markets beyond U.S. borders."

The U.S. sent more than 17% of 2025 milk production to overseas markets last year. U.S. suppliers set records for cheese (+20% to 613,045 MT), butterfat (+167% to 122,085 MT) and high-protein whey (+6% to 77,811 MT), amid growth in several categories, including milk protein concentrate, whole milk powder, yogurt, buttermilk and casein. (Note: USDEC adjusts whey numbers to China to account for misclassified product.)

Not all categories outperformed the previous year. Lower U.S. production of nonfat dry milk/skim milk powder (NFDM/SMP) reduced U.S. ability to play a larger global role in that market. Year-over-year NFDM/SMP exports fell 9% in 2025 (-66,878 MT).

But U.S. dairy remains extremely well-positioned to meet expanding global nutritional needs.

"There are always hurdles. We are facing challenges now and there will be more ahead," said Harden. "Anticipating and addressing those challenges is part of USDEC's mission. We are committed to finding solutions and helping to create a level playing field for U.S. dairy to thrive."

That includes addressing lopsided growth in milk component levels—with fat outpacing protein—that will challenge the U.S. to become a more consistent global supplier of products like butter, anhydrous milkfat (AMF) and whole milk powder (WMP).

Challenges are not new.

"Last year, USDEC celebrated its 30th anniversary. Over three decades, the organization and the U.S. industry have had to adapt to meet the diverse needs of buyers from around the world," Harden says. "It's never simple, but nutrition, taste and the functional benefits of dairy ingredients will continue to drive global dairy demand, and I am optimistic the U.S. will continue to evolve to meet the world's dairy needs."

Here are some selected highlights from the data:

- U.S. cheese export growth is balanced and broad based. U.S. dairy suppliers sold more than 1,000 MT of cheese to 37 countries in 2024. In 2025, sales grew to 32 of those countries, with 24 rising by double-digits. Declines to the other five countries were due mostly to extenuating circumstances, such as retaliatory tariffs in China and geopolitical turmoil in Venezuela.
- U.S. cheese exports exceeded 50,000 MT in eight out of 12 months in 2025. Before 2025, they had never topped 50,000 MT in a single month.
- U.S. butterfat exports exceeded 100,000 MT for the first time and did so handily. Butter volume rose 163% to 83,524 MT and AMF and dairy spreads increased 176% to 38,561 MT.
- While Canada remained the top U.S. butterfat buyer for the year and U.S. exports to Canada jumped 50% (+14,225 MT), its share of U.S. volume dropped from 62% in 2024 to 35% in 2025, as U.S. sellers significantly diversified their market reach. The United States posted big gains to the Middle East/North Africa (+1,571%, +17,844 MT), the European Union (+4,572%, +13,872 MT) and Mexico (+194%, +9,525 MT).
- U.S. suppliers diversified in high-protein whey (WPC80+) as well. Shipments to Japan, a long-time market leader, jumped 32% to 16,612 MT, but the United States also saw significant growth to the European Union (+44% to 10,183 MT), Southeast Asia (+52% to 6,548 MT) and India (+38% to 5,347 MT). An estimated 45% decline (-7,117 MT) to the No. 1 U.S. WPC80+ customer, China, limited overall category growth to 6% (+4,412 MT). (Note: USDEC adjusts whey numbers to China to account for misclassified product.)
- Mexico remained the top U.S. market by value in 2025, accounting for 27% of exports by value or $2.6 billion. It was the leading buyer of U.S. cheese ($965 million) and NFDM/SMP ($1.1 billion).
- Total U.S. dairy exports to Australia surged 77% to a record annual volume of 67,203 MT. The country became the No. 3 U.S. butter buyer (up exponentially to 6,553 MT) after not even ranking within the top 40 U.S. destinations in 2024. It also solidified its position as the No. 4 U.S. cheese market, with volume up 60% to 44,374 MT and became a country to watch moving forward in WPC80+, with volume up 153% to 1,946 MT.

Alltech launchesnutrition service capabilities in South Asia with new state-of-the-art laboratory in Pune

Alltech President and CEO Dr. Mark Lyons unveiled the **Alltech Nutrition Service Laboratory** at the company's Pune facility on Jan. 16, marking animportant step in strengthening nutrition support across South Asia for Alltech. The event was attended by Alltech customers, farmers, partners, industry leaders and media and celebrated with music, dancers and floral decorations,reflecting the energy and optimism of the Alltech South Asia team.

The newly launched Nutrition Service Laboratory has been designed to support farmers at large and feed producers across theregion at a time when South Asia is facing increasing protein demand alongside growing feed quality and safety challenges.

"As South Asia grows, so does the region's demand for premium animal protein. This is a massive opportunity for South Asian farmers, but it requires a new level of precision," said Dr. Mark Lyons, president and CEO of Alltech. "By launching this new laboratory in Pune, we are delivering real-time, actionable intelligence. Pairing our laboratory precision with our on-farm tools such as Alltech RAPIREAD™ and infrared thermography offers farmers a roadmap to superior animal health, stronger productivity and long-term sustainability."

The lab can test 50 feed and raw material parameters in Phase 1, with plans to nearly double this capacity in the next phases. These services are complemented by advanced on-farm tools such asAlltech® RAPIREAD™, infrared cameras, eggshell analysis tools and Draeger meters, ensuring producers and farmers receive practical, science-based support across the poultry, dairy and aqua sectors.

Highlighting the importance of the new laboratory, Dr. Aman Sayed, Alltech's managing director for India and regional director for South Asia, emphasized its role in translating science into practical outcomes.

"The Nutrition Service Lab is not just a testing facility, it is a bridge between science and the farm," said Dr. Aman. "It helps the users to clearly understand what is happening in their feed and raw materials and allows us to guide them with practical, targeted nutritional solutions that deliver real value."

Alltech South Asia is also pleased to announce expanded production capabilities with a new bolusmanufacturing unit featuring a capacity of 10,000 boluses per hour.Bringing this production inhouse will enhance efficiency, improve supply reliability and reduce environmental impact,all benefits that extend directly to neighboring markets.

The Pune facility also reflects Alltech's commitment to sustainability, with major investments in clean energy and environmentally responsible operations.

About Alltech:

Founded in 1980 by Irish entrepreneur and scientist Dr. Pearse Lyons, Alltech delivers smarter, more sustainable solutions for agriculture. Our diverse portfolio of products and services improves the health and performance of animals and plants, resulting in better nutrition for all and a decreased environmental impact.

We are a global leader in the agriculture industry. Our team produces specialty ingredients, premix, supplements, feed and biologicals, backed by science and an unparalleled platform of services.

Strengthened by more than 40 years of scientific research, we carry forward a legacy of innovation and a unique culture that views challenges through an entrepreneurial lens. As a private, family-owned company, we adapt quickly to our customers' needs and focus on advanced innovation.

We believe agriculture has the greatest potential to shape the future of our planet. Our more than 5,000 talented team members worldwide share our purpose of Working Together for a Planet of Plenty®. Together, we can provide nutrition for all, revitalize local economies and replenish the planet's natural resources.

Headquartered just outside of Lexington, Kentucky, USA, Alltech serves customers in more than 140 countries, has five bioscience centers, and operates more than 75 manufacturing facilities across the globe.

For more information, visit alltech.com, or join the conversation on Facebook, X and LinkedIn.

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Amul Launches AI Platform, Marking New Chapter for Cooperative Dairy Sector

Gandhinagar, 11 February 2026: In a landmark step towards integrating Artificial Intelligence with India's cooperative dairy ecosystem, Gujarat Chief Minister **Bhupendra Patel** inaugurated Amul AI, describing it as a transformative initiative that will modernise agriculture, animal husbandry and the dairy sector while strengthening the vision of self-reliance under the leadership of Prime Minister **Narendra Modi**.

The launch event, organised in Anand by Amul — globally recognised as one of the world's leading dairy cooperatives representing over 36 lakh milk producers across 18,500 villages in Gujarat — signalled the beginning of what leaders termed a "smart cooperative revolution."

The programme was attended by Gujarat Legislative Assembly Speaker and Chairman of Banas Dairy Shankar Chaudhary, Agriculture and Animal Husbandry Minister Jitu Vaghani, Food and Civil Supplies Minister Raman Solanki, Minister of State for Finance Kamlesh Patel, along with senior officials of the Gujarat Cooperative Milk Marketing Federation (GCMMF).

Confluence of Government, Cooperative and Technology

Addressing thousands of dairy farmers and cooperative members, Chief Minister Bhupendra Patel emphasised that India's rapid economic progress over the past decade has been powered by the convergence of governance reforms and digital technology.

He drew parallels with the success of India's digital payment revolution, noting that when UPI was first introduced, scepticism was widespread. Today, however, even small vendors and rural traders actively use digital transactions. According to the Chief Minister, Artificial Intelligence represents the next frontier in this digital transformation.

He stated that the integration of Government initiatives, cooperative strength (Sahkar), and advanced technology has already accelerated development, and that AI will further multiply this momentum within the dairy sector.

Amul AI: Smartening the Cooperative Ecosystem

Amul AI has been designed as an advanced digital platform that integrates vast farmer databases, milk procurement systems and analytics-driven decision-making tools into a unified ecosystem. By leveraging Artificial Intelligence, the cooperative aims to:

- Improve milk quality monitoring
- Provide real-time data access to farmers
- Enhance transparency in fat and SNF measurement
- Optimise herd health management
- Strengthen traceability and supply chain efficiency

The Chief Minister described Amul AI as a critical step toward making the cooperative ecosystem "smart" — from village-level milk producers to central processing units.

By combining indigenous innovation with digital infrastructure, Amul is positioning itself to deliver what the Chief Minister termed "Advantage India" in the global dairy arena.

Union Budget 2026: Focus on Dairy and Animal Husbandry

Highlighting policy support at the national level, the Chief Minister referred to the Union Budget 2026, which is structured around three core duties and places strong emphasis on farmers and milk producers.

Among the major announcements is a special provision to train 20,000 veterinary professionals to strengthen the dairy ecosystem. This move is expected to significantly enhance veterinary services, disease management and productivity across rural India.

He noted that the welfare of small and marginal farmers — many of whom depend on dairy as a steady source of income — remains central

to national development policy.

Trade Agreements and Safeguarding Farmers

The Chief Minister also addressed recent trade agreements with the United States and the European Union, stating that under the Prime Minister's leadership, dairy imports were excluded from these arrangements.

This decision, he said, has safeguarded the livelihoods of more than 10 crore small and marginal farmers dependent on milk production in India. By protecting domestic dairy markets from external pressures, the government has ensured stability and long-term growth opportunities for Indian producers.

He expressed confidence that these global trade engagements, coupled with domestic technological advancement like Amul AI, will propel India towards becoming a global dairy hub.

Strengthening Women's Economic Empowerment

Agriculture and Animal Husbandry Minister Jitu Vaghani described the launch as a historic moment for Gujarat. He emphasised that nearly 94% of dairy payments are now directly deposited into the bank accounts of women associated with animal husbandry, highlighting the role of dairy cooperatives in promoting financial inclusion and women's empowerment.

He remarked that just as smartphones and UPI became part of daily life, AI-based solutions will soon become integral tools for dairy farmers.

Tribute to the Legacy of Anand

Speaker Shankar Chaudhary reflected on Anand's historic significance as the birthplace and karmabhoomi of White Revolution pioneers Tribhuvandas Patel and Dr. Verghese Kurien. He described the event as a proud moment for the cooperative movement, particularly in the presence of thousands of farmers.

He also highlighted the launch of Amul's "Sarala" mobile app, which enables farmers to access detailed information regarding milk fat, SNF content and daily accounts directly through their mobile devices — a first-of-its-kind initiative globally.

Indigenous Innovation for Viksit Bharat 2047

Chief Minister Bhupendra Patel described Amul AI as a firm step toward achieving the vision of "Viksit Bharat 2047." He stated that indigenous, self-reliant technological solutions are key to delivering global standards while maintaining cooperative values.

By integrating data analytics, AI-driven advisory services and digital transparency, Amul aims to enhance income stability for its members while ensuring operational excellence.

He expressed optimism that innovation will become the principal driver of economic growth in the coming years, with the cooperative sector playing a leading role alongside agriculture and rural development.

Technical Demonstration and Participation

The Amul AI platform was officially inaugurated digitally by the Chief Minister, followed by a short film presentation showcasing the application's features. Dr. Shankar, who led the development of the AI platform, elaborated on its functionalities and long-term vision.

Amul Managing Director Jayen Mehta also addressed the gathering, underscoring the organisation's commitment to technological leadership and farmer-centric growth.

The event concluded with a vote of thanks by Amul Vice Chairman Gordhanbhai Dhameliya.

Towards a Smarter Dairy Future

The launch of Amul AI marks a pivotal moment in India's dairy evolution. From digitising procurement systems to empowering farmers with real-time information, the initiative reflects a broader national shift toward technology-driven rural development.

By combining cooperative strength, government support and Artificial Intelligence, Gujarat's dairy sector is positioning itself at the forefront of innovation.

As India advances toward its goal of becoming the dairy hub of the world, initiatives such as Amul AI may well define the next chapter of the White Revolution — one powered not only by milk, but by data, intelligence and digital empowerment.

Editorial Calendar 2026

Publishing Month:
January
Article Deadline :
18th, Dec. 2025
Advertising Deadline :
20th, Dec. 2025
Focus :
Opportunities and Challenges

Publishing Month:
February
Article Deadline :
18th, Jan. 2026
Advertising Deadline :
20th, Jan. 2026
Focus :
Budget

Publishing Month:
March
Article Deadline :
18th, Feb. 2026
Advertising Deadline :
20th, Feb. 2026
Focus :
Summer Stress Management

Publishing Month:
April
Article Deadline :
18th, March 2026
Advertising Deadline :
20th, March 2026
Focus :
Cold Chain

Publishing Month:
May
Article Deadline :
18th, April 2026
Advertising Deadline :
20th, April 2026
Focus :
Nutrition

Publishing Month:
June
Article Deadline :
18th, May 2026
Advertising Deadline :
20th, May 2026
Focus :
Milk - Production & Preservation

Publishing Month:
July
Article Deadline :
18th, June 2026
Advertising Deadline :
20th, June 2026
Focus :
Monsoon Management

Publishing Month:
August
Article Deadline :
18th, July 2026
Advertising Deadline :
20th, July 2026
Focus :
Sustainability

Publishing Month:
September
Article Deadline :
18th, August 2026
Advertising Deadline :
20th, August 2026
Focus :
Processing & Packaging

Publishing Month:
October
Article Deadline :
18th, September 2026
Advertising Deadline :
20th, September 2026
Focus :
Disease Prevention

Publishing Month:
November
Article Deadline :
18th, October 2026
Advertising Deadline :
20th, October 2026
Focus :
Biosecurity

Publishing Month:
December
Article Deadline :
18th, November 2026
Advertising Deadline :
20th, November 2026
Focus :
Winter Stress

Subscription Rates

Time Period

1 Year	**INR 2400**	**USD**	**250**
3 Year	**INR 6500**	**USD**	**650**
5 Year	**INR 10000**	**USD**	**1000**

**18% GST Extra*

We wish to subscribe the following

Poultry Planner
☐ 1 Year ☐ 3 Year ☐ 5 Year
from_____to_____

Dairy Planner
☐ 1 Year ☐ 3 Year ☐ 5 Year
from_____to_____

Poultry Times of India
☐ 1 Year ☐ 3 Year ☐ 5 Year
from_____to_____

Grand Total: _____

Contact Name : _____

Company Name : _____

Postal Address : _____

City : _____ State : _____ Mob. No._____

Postal Code : _____ Country : _____

Payment Details:

Send DD or Cheque in favour of Pixie Expomedia Pvt. Ltd. payable at Karnal
Address: C/o OmAng Hotel, Namaste Chowk, Near Janta Petrol Pump, KARNAL - 132001 (Haryana) INDIA or Transfer money to Canara Bank
Bank address: Sector 12; U Estate Karnal
Account Type: Current
Account Name: Pixie Expomedia Pvt. Ltd.
Account Number: 120000991579
IFSC Code: CNRB0003264 | Swift Code: CNRBINBBBFD | PAN No. AAMCP6787A

For more detail, contact:

pixie expomedia
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Pixie Expomedia Pvt. Ltd.
C/o OmAng Hotel, Namaste Chowk, Near Janta Petrol Pump, KARNAL - 132001 (Haryana) INDIA

Date:_____ Company's Stamp & Signature

By signing this form I acknowledge that I have read and agree to the quoted cost above

*5% GST Extra Advertisement Tariffs

Advertisement Type	Single Issue (INR)	Single Issue (USD)		Advertisement Type	Single Issue (INR)	Single Issue (USD)		Advertisement Type	Single Issue (INR)	Single Issue (USD)	
Front Cover	30,000	500	☐	Back Cover	20,000	300	☐	Centre Spread	25,000	400	☐
Front Gate Fold 1A	25,000	400	☐	Back Gate Fold 1A	20,000	300	☐	Full Page Random	10,000	200	☐
Front Gate Fold 2A	25,000	400	☐	Back Gate Fold 2A	20,000	300	☐	Up to Page 9	15,000	250	☐
Front Inside	20,000	300	☐	Back Inside	18,000	275	☐				
Front Opening	20,000	300	☐	Back Opening	18,000	275	☐				

IRIS

MONEY

doesn't talk, it swears

Happy cow Plus milk

4 Benefits

1. Money Plus Improves milk yield
2. Improves the fat percentage
3. Improves reproductive performance
4. Helps in better growth

2 Goals

1. More Milk
2. More Profit !!!

FOR FURTHER INFORMATION
please contact +91 80 48663242 or admin@irides.in
or visit our website www.irides.in

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with us

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Today
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Growing

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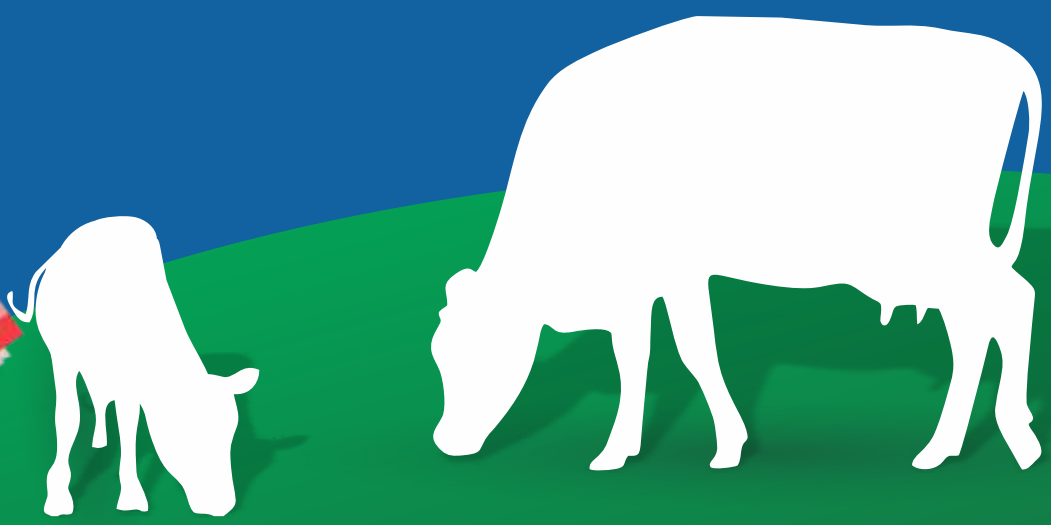

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