International Journal of Veterinary Sciences and Animal Husbandry 2025; SP-10(7): 19-23

ISSN: 2456-2912
NAAS Rating: 4.61
VET 2025; SP-10(7): 19-23

www.veterinarypaper.com
Received: 04-05-2025
Accepted: 03-06-2025

Ravindra Kumar Mishra
Shri Venkateshwara University, Amroha, Uttar Pradesh, India

Dr. Deepti Gupta
Shri Venkateshwara University, Amroha, Uttar Pradesh, India

Corresponding Author:
Ravindra Kumar Mishra
Shri Venkateshwara University, Amroha, Uttar Pradesh, India

Dairy farming in Uttarakhand: A promising venture for micro and small enterprises

Ravindra Kumar Mishra and Deepti Gupta

Abstract
Dairy farming in Uttarakhand represents a sustainable and economically viable opportunity for micro and small-scale enterprises, contributing significantly to rural livelihoods and regional development. This paper evaluates the potential of dairy entrepreneurship in the region by analyzing the current industry landscape, production methodologies, market dynamics, financial frameworks, and government support systems. Uttarakhand's favorable agro-climatic conditions, characterized by its temperate climate and abundant fodder resources, coupled with a rising demand for dairy products driven by urbanization and health-conscious consumer trends, create lucrative prospects for value-added production, supply chain integration, and technological advancements. Commercial dairy farming plays a pivotal role in the economic upliftment of rural communities, particularly in hilly and mountainous states like Uttarakhand, where arable land is scarce, and alternative livelihood options are limited. The growth of the dairy sector hinges on robust infrastructural support, including access to dairy cooperatives, milk societies, and collection centers, which ensure fair remuneration for farmers. Moreover, the adoption of modern livestock husbandry practices, such as improved breed selection and feed management, alongside socio-economic factors like farmer awareness and entrepreneurial aspirations, significantly influences the efficiency and scalability of dairy businesses. Government initiatives, such as the Rashtriya Gokul Mission and the Dairy Entrepreneurship Development Scheme (DEDS), further bolster the sector by providing subsidies, training, and access to credit, enabling small-scale farmers to innovate and compete in an increasingly organized market. This study underscores the transformative potential of dairy farming in fostering inclusive economic growth and sustainable development in Uttarakhand.

Keywords: Dairy farming, Uttarakhand, rural livelihoods, dairy entrepreneurship, sustainable development, value-added production, market integration, livestock management, government schemes, small-scale enterprises.

1. Introduction
Dairy farming is a cornerstone of Uttarakhand's agrarian economy. It is deeply intertwined with the socio-cultural fabric of its rural communities. State's favorable agro-climatic conditions, including its temperate climate, lush green pasturelands, and abundant water resources, provide optimal environment for dairy production, promising venture for micro and small-scale entrepreneurs (Manual, 2019) [6]. Increasing consumption of milk and value-added dairy products, such as paneer, ghee, yoghurt and fermented milk derivatives, further enhances the sector's economic viability. Uttarakhand's dairy industry blends traditional livestock husbandry practices with emerging innovations, such as improved fodder management and selective breeding, creating a dynamic ecosystem that supports sustainable investment and employment generation for rural youth and women (Rana & Bisht, 2023) [11].
Thus it serves as a critical strategy for diversifying income sources and mitigating agricultural risks. In Uttarakhand, dairy farming is particularly significant for landless and marginalized farmers, offering a stable livelihood and acting as a socio-economic safety net as arable land is limited. Cows, buffaloes and goats, the primary sources of milk in commercial dairy farming, contribute significantly to global milk production. Uttarakhand's farmers leveraging indigenous breeds like the Badri cow alongside high-yielding crossbred varieties to meet market demands. This dual approach not only ensures productivity but also preserves the region's genetic diversity.

Dairy farming's transformative potential extends beyond economics, fostering social and gender empowerment by engaging women in dairying and cooperative activities, thereby improving household nutrition and community welfare (Berry, 2023) [1]. The state's hilly terrain and biodiversity influences fodder availability and herd management practices, making geographical factors like soil fertility and climate pivotal to the success of dairy enterprises. In mountainous regions, where steep slopes and fragmented landholdings limit traditional agriculture, dairy farming offers a viable alternative by capitalizing on grazing lands and local fodder species. The establishment of dairy cooperatives and milk collection centers has further strengthened the sector by providing farmers with access to organized markets and fair pricing, addressing historical challenges of exploitation by middlemen. These institutional mechanisms facilitated farmers to adopt modern practices towards silage preparation and disease management, to enhance productivity and profitability (Berry, 2023) [1].

This review investigates the viability of dairy farming in Uttarakhand as a sustainable micro and small enterprise, focusing on the diverse product range (e.g., fresh milk, curd, butter, and specialty cheeses), resource requirements (e.g., robust cattle breeds, feed systems, and shed infrastructure), market potential (e.g., retail and institutional supply chains), and financial projections (e.g., capital investment and revenue models). In light of environmental, socio-economic, and institutional factors, this study aims to provide a comprehensive framework for entrepreneurs seeking to establish or expand dairy ventures in Uttarakhand, contributing to rural development and economic inclusivity.

2. Product Scope and Applications

Dairy farming in Uttarakhand mainly focuses on the p production of cow and buffalo milk which acts as a fundamental raw material for a diverse range of traditional and value-added dairy products. These products not only fulfillment the nutritional needs of local households but also addresses to regional demand, offering both dietary and commercial benefits (Pandya *et al*., 2006) [10].

The principal products derived from dairy farming include:

- **Curd (Dahi):** A staple component of daily diets in Uttarakhand, valued for its probiotic properties and culinary versatility.
- **Ghee (Clarified Butter):** An essential ingredient in both traditional cooking and rituals, ghee holds significant cultural and commercial importance.
- **Paneer (Cottage Cheese):** Widely used in household and restaurant cooking & it serves as a protein-rich, adaptable ingredient in vegetarian diets.
- **Traditional Sweets (e.g., Peda, Burfi, Rasgulla):** These milk-based confections experience heightened demand during festivals, weddings, and tourist seasons, making them a lucrative sub-sector for dairy entrepreneurs.

In addition to the traditional products range, the increasing consumer preferences for organic, chemical free and non-artificial dairy products offers new opportunities for market diversification both within and outside Uttarakhand (Murtaza *et al*., 2017) [8]. This diversity in product applications strengthens the commercial viability of dairy enterprises by allowing producers to respond flexibly to market trends, seasonal demands and consumer preferences, while also fostering opportunities for branding and value chain integration.

3. Industry Outlook and Market Dynamics

India's dairy sector is poised for sustained expansion, underpinned by strong domestic demand and structural growth drivers. It is projected that the industry is expected to grow at a compound annual growth rate of approximately 13% between 2024 and 2032, potentially reaching a market valuation of Rs. 49,953.5 billion by the end of the forecast period (IMARC, 2023) [5]. This upward trajectory is largely attributed to the combined effects of rapid urbanization, evolving dietary patterns, rising health consciousness, and economic recovery following the COVID-19 pandemic.

Within this national context, Uttarakhand's dairy industry demonstrates promising localized growth, supported by a unique blend of state-specific opportunities:

- **Government Support:** Skill-development programs, and financial assistance under schemes such as the Dairy Entrepreneurship Development Scheme (DEDS) and the RashtriyaGokul Mission have enhanced the sector's accessibility for small and marginal farmers.
- **Tourism-Driven Demand:** The flourishing hospitality sector, particularly in tourist-centric districts like Nainital, Mussoorie, Rishikesh, and Jim Corbett National Park, generates consistent demand for fresh milk, ghee, paneer and milk-based sweets (Bisht & Choudhuri, N.D., 2024 [2].
- **Consumer Preference for Organic and Value-Added Products:** Growing awareness of food safety and nutrition has catalyzed demand for organic milk, artisanal dairy products, and probiotic-rich offerings, creating niche opportunities for small and medium dairy enterprises.
- **Technological Adoption:** The gradual introduction of mechanized milking systems, cattle health monitoring, and improved feed formulations has started reshaping dairy operations, and thus enhancing productivity.

However, despite this favorable outlook, the sector faces persistent structural challenges, related to the state's hilly and fragmented topography. Difficulties in transportation logistics, high operational costs, and the need for compliance with stringent food safety regulations often limit the scalability of dairy businesses. Moreover, competition from well-established cooperative networks and private players adds to the pressure on small-scale producers to maintain consistent quality and competitive pricing.

Nevertheless, Uttarakhand's dairy ecosystem is resilient and dynamic. The success of state-led cooperative ventures, such as the "Aanchal" brand managed by the Uttarakhand Cooperative Dairy Federation (UCDF), along with the emergence of private enterprises like Ashish Dairy and DSR Foods, exemplifies the sector's growing vibrancy and market adaptability. These developments underscore the potential for dairy farming not only as a means of livelihood but also as a contributor to regional economic diversification and rural entrepreneurship.

4. Infrastructure and Process Design

A well-structured infrastructure and scientifically-informed process design are essential for the sustainability and scalability of dairy enterprises. Strategic planning around breed selection, fodder resources, hygienic handling, and compliance with quality standards collectively underpin both

productivity and market competitiveness as far as Uttarakhand state is concerned.

4.1 Raw Materials and Breed Selection

The choice of dairy breeds plays a pivotal role in determining milk yield, animal health, and adaptability to the state's varied agro-climatic conditions (Walia & Kaur, 2023) [15]. Farmers in Uttarakhand typically rear a combination of indigenous and crossbred cattle, chosen for their specific strengths:

- **Holstein Friesian:** Known for their exceptionally high milk production, particularly suited to well-managed, stall-fed systems, in mid lower Himalyan plains.
- **Jersey:** Favored for small-scale dairy operations due to their efficient feed-to-milk conversion ratio, medium body size and adaptability to moderate climates.
- **Sahiwal:** An indigenous breed valued for its heat tolerance, disease resistance, and stable milk output under local conditions.
- **Badri Cow:** The Badri cow, also known as the Pahadi cow, is a native cattle breed of Uttarakhand, India and is known for its hardiness and adaptation to the hilly terrain of the region. They are known for their small size, sure-footedness, and ability to graze on medicinal herbs.

In addition to breed selection, the consistent availability of quality fodder is fundamental. Key fodder resources include Napier grass, Lucerne, maize, barley, oats, finger millet, and barnyard millet and locally sourced agro-industrial by-products such as oilseed cakes and corn silage. Access to clean water and veterinary healthcare services is equally critical for maintaining herd health and ensuring sustained lactation performance.

4.2. Manufacturing Process

The dairy production cycle follows a standardized sequence designed to maintain hygiene, nutritional value, and product safety (Sudhakaran V & Minj, 2020) [13]:

1. **Milk Collection:** Milk is harvested either manually or via automated milking systems, followed by filtration to remove physical impurities.
2. **Pasteurization:** Heat treatment is applied as per requirement to eliminate pathogenic microorganisms and extend shelf life, particularly in fluid milk and packaged dairy products.
3. **Product Processing:** Collected milk is transformed into various value-added products, including curd (dahi), clarified butter (ghee), cottage cheese (paneer), and other derivatives, depending on market demand.
4. **Packaging:** Finished products are packed in hygienic, food-grade containers, labeled in accordance with regulatory norms to ensure traceability and consumer safety.
5. **Distribution:** Packaged dairy items are supplied to local retail outlets, cooperative societies, institutional buyers (hotels, restaurants), and direct-to-consumer networks.

Adherence to regulatory frameworks, including Bureau of Indian Standards (BIS) specifications such as IS 11799:1986 for hygienic milk production and IS 12237:1987 for safe handling and packaging, ensures that the final products meet national quality and safety benchmarks.

5. Financial Viability and Profitability

The economic feasibility of dairy entrepreneurship in Uttarakhand is closely linked to prudent financial planning, a balanced product portfolio, and strategic market positioning (Sharma *et al*., 2009) [12]. A typical small-scale dairy unit, designed for a processing capacity of 300 liters per day, illustrates the following financial outlook.

5.1 Project Costing and Finance Structure

Component	Estimated Value
Total Project Investment	₹ 30.00 Lakhs
Bank Financing (75%)	₹ 22.058 Lakhs
Promoter's Equity Contribution (25%)	₹ 7.50 Lakhs
Installed Processing Capacity	300 liters/day

This financial model assumes a blend of institutional bank loans and personal investment, enabling entrepreneurs to leverage credit facilities while maintaining ownership control.

5.2 Estimated Profitability Projections (Year I)

Parameter	Estimated Value
Annual Sales Revenue (Approx cost of Milk @ Rs.60.00/Liter)	₹ 65.700 Lakhs
Cost of Production/Year (Recurring/Non-Recurring)	₹ 50.00 Lakhs
Net Profit	₹9.00 Lakhs
Break-even Revenue Level	₹ 40.00 Lakhs

The financial sustainability of the venture is underpinned by the production of both staple and value-added dairy products such as ghee, paneer and curd. The higher profit margins associated with value-added products significantly improve the return on investment, even in fluctuating market conditions.

6. Operational Requirements

The successful execution of dairy operations requires an efficient human resource framework, combining skilled, semi-skilled, and unskilled labor to ensure smooth handling of animal care, processing, and logistics.

6.1. Manpower allocation and cost estimates on the basis of min wages rule as per Govt.

Role	Number of Employees	Monthly Wage (Rs.)	Annual Expense (Rs. Lakhs)
Skilled Workers	2	22,000.00	5.28
Semi-skilled Workers	2	17000.00	4.08
Unskilled Workers	3	12000.00	4.32
	Total Annual Labor Cost		13.68 Lakhs

This labor framework ensures optimal workforce distribution across critical functions such as milking, animal husbandry, processing, packaging, and distribution.

6.2 Machinery and Equipment

A robust infrastructural backbone is vital for ensuring hygiene, efficiency, and scalability in dairy operations. The essential machinery setup includes:

- **Milking Machines:** Enhance milking efficiency and reduce contamination risk.
- **Bulk Milk Coolers:** Maintain milk quality by preserving it at optimal temperatures.
- **Pasteurizers and Cream Separators:** Facilitate processing of value-added products.
- **Cattle Feed Grinders:** Enable on-site feed preparation, optimizing nutritional inputs.

Additional infrastructure such as refrigeration units, stainless steel furniture, and basic laboratory equipment for quality testing ensures compliance with food safety norms. Equipment may be sourced from established vendors such as Ved Engineering and Osahan Tools, known for supplying dairy-grade machinery.

7. Marketing and Regulatory Landscape

7.1 Market Challenges

Despite promising growth trajectory of the dairy sector, several challenges must be addressed for successful market penetration:

- **Brand Competition:** Dominance of national brands like *Amul* and *Mother Dairy* can limit market share for new entrants.
- **Logistics in Remote Areas:** Difficult terrain impacts transportation and timely delivery of perishable goods.
- **Regulatory Compliance:** Adherence to *FSSAI*, *pollution control norms*, and *municipal regulations* requires meticulous planning and documentation.

7.2 Required Approvals and Registrations

To ensure legal operations and eligibility for financial incentives, dairy enterprises must obtain the following:

- **FSSAI License:** Mandatory for food production and safety assurance.
- **Animal Husbandry Department Registration:** For tracking livestock health and accessing veterinary services.
- **Environmental Clearances:** Particularly important for waste management in hilly ecosystems.
- **MSME and GST Registration:** Offers tax benefits, easier loan processing, and integration into formal supply chains.

8. Strategic Integrations and Training

To ensure long-term sustainability, productivity, and inclusivity in dairy farming, strategic interventions across the value chain are essential.

8.1. Backward Integration

Backward integration strengthens the production base, reduces input costs, and improves efficiency. Key components include:

- **Fodder Cultivation:** Promotes self-reliance and cost-effective nutrition for livestock.
- **Selective Cattle Breeding:** Ensures high-yield and disease-resistant breeds, tailored to the regional climate.
- **Equipment Maintenance Contracts:** Minimizes downtime and ensures smooth operation of critical dairy machinery.

8.2 Forward Integration

Forward integration enhances value addition and market access, Priority strategies involve:

- **Product Branding and Packaging:** Boosts consumer trust and market differentiation, especially for organic and artisanal dairy lines.
- **E-commerce and Online Sales:** Expands reach through digital platforms, reducing dependence on intermediaries.
- **Community Partnerships:** Leverages local networks and cooperatives for grassroots-level branding and bulk sales.

8.3 Training Opportunities and Capacity Building

Skill development and modern practices are essential for improving profitability and sustainability. Training institutions include:

- G.B. Pant University of Agriculture and Technology, Pantnagar
- Krishi Vigyan Kendras (KVKs) across all districts of Uttarakhand
- SWAYAM and other Online Platforms offering modules on business management, dairy technology, and agri-entrepreneurship

Additionally, the following strategic measures are recommended to address systemic challenges and promote inclusive dairy development:

- **Expansion of dairy cooperatives:** State-supported cooperatives should be established across villages to empower farmers and reduce exploitation.
- **Financial assistance & credit access:** Timely credit facilities and advance payments are essential to reduce dependency on exploitative middlemen.
- **Establishment of Chilling Plants:** Each block should have modern chilling centers to ensure milk preservation and smooth collection/distribution.
- **Veterinary and Nutritional Support:** Regular health check-ups and provision of balanced diets must be ensured to enhance productivity.
- **Infrastructure Development:** Improvement in rural connectivity, roads, and transport will aid in logistics and market access.
- **Price determination mechanism:** A transparent pricing policy should be introduced to ensure fair remuneration for producers.
- **Promotion of high-yield breeds:** Adoption of scientifically selected, high-producing cows and buffaloes should be encouraged.
- **Workshops and Seminars:** Awareness campaigns and practical demonstrations should be conducted by government and NGOs to introduce modern dairy practices.
- **Utilization of animal waste:** Promote organic farming through proper handling and application of dung and urine to encourage sustainable mixed farming systems.

8.4 Women Empowerment in dairy farming

- Land Ownership Rights must be granted to women to enable independent entrepreneurship and access to cooperative credit.
- Free Access to Education and Training through co-operatives should be ensured, promoting gender equity and self-reliance.

9. Conclusion

Dairy farming in Uttarakhand has emerged as a sustainable and economically viable enterprise, particularly for micro and small-scale entrepreneurs in rural and semi-urban areas. The unique geographical and ecological conditions of the state, coupled with its rich tradition of livestock rearing, provide a strong foundation for dairy-based livelihoods. When strategically integrated with scientific animal husbandry practices, efficient financial planning, and structured market linkages, dairy farming holds immense potential to uplift local economies and ensure food security.

The socio-economic fabric of Uttarakhand, where a large section of population depends on agriculture and allied activities, further underscores the importance of dairy farming as a complementary source of income. Women, in particular, play a significant role in dairy operations, making the sector inherently inclusive and empowering. Moreover, dairy farming contributes to nutritional improvement, employment generation, and the overall resilience of rural households.

With India maintaining its position as the largest milk producer globally, the sector is witnessing rapid modernization and diversification. Uttarakhand, with its proactive government policies, access to natural resources, and growing demand for organic and value-added dairy products, is well-positioned to benefit from this upward trajectory. State-sponsored programs, cooperative models, and access to micro-financing are actively encouraging entrepreneurship in this sector.

In conclusion, dairy farming in Uttarakhand is more than just an agricultural activity it is a pathway to economic empowerment, rural development, and social progress. As entrepreneurs embrace innovative practices, digital tools, and value-chain integration, the state stands on the brink of transforming into a significant dairy hub in Northern India. To fully realize this potential, sustained investment in capacity building, infrastructure, and policy support will be crucial. With the right mix of traditional wisdom and modern innovation, dairy farming in Uttarakhand can serve as a model of inclusive and sustainable rural enterprise.

Conflict of interest
Not available

Financial Support
Not available

10. Reference

1. Berry S. Climate resiliency among the livestock rearers of Uttarakhand [Doctoral Dissertation]. National Dairy Research Institute, 2023.
2. Bisht NS, Choudhuri S. A study of the economic and geographic condition of the state of Uttarakhand and to identify the relevance of tourism industry. J Tour Stud, 2024.
3. Bureau of Indian Standards (BIS). IS 12237: Recommendations for housing of animals. New Delhi: BIS, 2004.
4. Food Safety and Standards Authority of India (FSSAI). Guidelines for milk and milk product licensing. New Delhi: FSSAI, 2022.
5. IMARC Group. India dairy market: Industry trends, share, size, growth, opportunity and forecast 2024-2032, 2024.
6. Manual F. Ministry of Agriculture participatory small-scale irrigation development program_II collaboration with sustainable land management and environment and climate change directorate, 2019.
7. Ministry of Animal Husbandry, Dairying and Fisheries, Government of India. Dairy entrepreneurship development scheme, 2023.
8. Murtaza MA, Pandya AJ, Haenlein GF, Khan MMH. Traditional Indian dairy products. In: Handbook of milk of non-bovine mammals, 2017, p. 343-367.
9. National Bank for Agriculture and Rural Development (NABARD). Model bankable project on dairy farming, 2023.
10. Pandya AJ, Mohamed M, Khan H. Traditional Indian dairy products. In: Handbook of milk of non-bovine mammals, 2006, p. 257-273.
11. Rana JC, Bisht IS. Reviving smallholder hill farming by involving rural youth in food system transformation and promoting community-based agri-ecotourism: A case of Uttarakhand state in north-western India. Sustainability. 2023;15(11):8816.
12. Sharma VP, Kumar K, Singh RV. Determinants of small-scale farmer inclusion in emerging modern agrifood markets: A study of the dairy industry in India. Ahmedabad: Indian Institute of Management, 2009.
13. Sudhakaran VA, Minj J. Basic facts about dairy processing and technologies. In: Dairy processing: Advanced research to applications, 2020, p. 1-24.
14. Uttarakhand Cooperative Dairy Federation Ltd. Annual report, 2023.
15. Walia SS, Kaur T. Livestock rearing (dairying). In: Basics of integrated farming systems. Singapore: Springer Nature Singapore, 2023, p. 51-65.

How to Cite This Article
Mishra RK, Gupta D. Dairy farming in Uttarakhand: A promising venture for micro and small enterprises. International Journal of Veterinary Sciences and Animal Husbandry. 2025;SP-10(7):19-23.