

COOPERATIVE DAIRY FARMING AS A PATHWAY TO RURAL ECONOMIC DEVELOPMENT IN UTTARAKHAND

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Abstract

Dairy farming is an important component of the rural economy of Uttarakhand because it provides recurring cash income, creates employment close to the household, supports mixed farming and offers a productive role to family labour. The cooperative model strengthens these benefits by aggregating small quantities of milk, organising collection and quality testing, providing access to inputs and services, and connecting producers with processing and consumer markets. This paper examines cooperative dairy farming as a pathway to rural economic development in Uttarakhand, with particular attention to the Uttarakhand Cooperative Dairy Federation (UCDF), its Aanchal brand, village dairy cooperative societies and district milk unions. The study uses secondary information from official statistical publications and institutional sources. It analyses trends in milk production, the economic logic of producer cooperation, income and employment effects, women's participation, market access, value addition, government support and the constraints created by mountainous geography. Official animal husbandry statistics show that milk production in Uttarakhand increased from 1,792.37 thousand tonnes in 2018–19 to 1,957.25 thousand tonnes in 2024–25, although the trend was not uniform in every year. The paper argues that the developmental value of dairying depends not only on increasing output but also on improving productivity, procurement, cold-chain infrastructure, transparent payments, cooperative governance and local value addition. The findings indicate that cooperative dairying can reduce transaction costs for small producers and create backward and forward linkages in the rural economy. Stronger women's membership, better fodder and veterinary services, digitalisation, hill-appropriate logistics, youth entrepreneurship and product diversification can increase its contribution to inclusive rural development.

Keywords: Dairy cooperatives, rural development, Uttarakhand, UCDF, Aanchal, milk production, rural employment, women's participation, agricultural diversification.

1. Introduction

1.1 Background

Rural economic development involves more than an increase in agricultural output. It includes diversification of livelihoods, improvement in productivity, creation of employment, expansion of market access, development of local institutions and a reduction in vulnerability. In India, these objectives are particularly important for small and marginal farm households because crop income is often seasonal and exposed to weather and price risks. Allied activities such as dairying can complement cultivation and provide a more frequent flow of cash income. Uttarakhand presents a distinctive setting for this discussion. The state combines relatively well-connected plains with extensive hill regions characterised by small holdings, scattered settlements, difficult transport conditions and limited scope for large-scale mechanised agriculture. In many villages, livestock is closely integrated with household production. Cattle and buffaloes provide milk, dung for manure and an asset that can support household resilience. Dairy activity can therefore serve both subsistence and commercial purposes.

1.2 Why the Cooperative Model Matters

Milk is a highly perishable commodity. A small producer who sells only a few litres a day cannot easily store the product, transport it over long distances or negotiate with large buyers. These characteristics create high

transaction costs and weak bargaining power. A cooperative can aggregate milk from many households, arrange collection and transport, test quality, process milk and market dairy products. In economic terms, collective organisation helps small producers achieve some of the scale advantages that they cannot achieve individually. The Uttarakhand Cooperative Dairy Federation Ltd. (UCDF) is the apex state federation of district milk cooperative unions. It was registered in 2001 and markets products under the Aanchal brand. UCDF states that its network covers all 13 districts through 11 district-level member cooperative milk unions, with Rudraprayag linked under Pauri Garhwal and Bageshwar under Almora. This institutional network gives cooperative dairying an important place in the state's rural development strategy.

1.3 Central Argument

The central argument of this paper is that cooperative dairy farming can promote rural economic development when production support and market organisation are developed together. Higher milk output alone is insufficient if farmers face weak procurement, high transport costs or low price realisation. Conversely, a strong cooperative network requires a reliable production base, productive animals, adequate feed, animal health services and active producer participation. The pathway to development is therefore institutional as well as technological.

2. Objectives and Research Methodology

2.1 Objectives of the Study

- To examine the economic importance of cooperative dairy farming in Uttarakhand.
- To analyse milk production trends and the structure of the organised cooperative dairy sector.
- To study the role of dairy cooperatives in income generation, employment and local economic linkages.
- To examine the contribution of women to dairy production and the potential for economic empowerment through cooperative membership.
- To assess the importance of market access, value addition, government programmes and institutional support.

2.2 Methodology and Sources

The study is descriptive and analytical and is based on secondary data. Major sources include Basic Animal Husbandry Statistics published by the Department of Animal Husbandry and Dairying, Government of India; information published by the Uttarakhand Cooperative Dairy Federation; National Dairy Development Board publications; and policy material relating to dairy development and cooperatives. Quantitative data are used to show the direction of milk production, while institutional information is used to interpret the economic role of cooperative organisation. The analysis uses concepts from development economics such as diversification, transaction costs, market failure, economies of scale, labour absorption, income multipliers, value chains and inclusive growth. The purpose is not only to describe the dairy sector but also to explain the mechanisms through which cooperative dairying can affect rural welfare.

3. Rural Economy of Uttarakhand and the Role of Livestock

3.1 Mountain Economy and Smallholder Production

The geography of Uttarakhand shapes the opportunities available to rural households. In hill districts, cultivable land is often fragmented and terraced, villages may be distant from major markets and transport costs can be high. These conditions limit the viability of some forms of commercial agriculture. Livestock, however, can be maintained on a relatively small land base and can use family labour and locally available biomass. Dairying therefore fits naturally within mixed-farming systems. The economic role of livestock is also linked to risk management. Crop output may be received once or twice a year, whereas milk can be sold daily. A household with both crop and dairy income has a more diversified income portfolio. This does not remove risk, because dairy

farmers face animal disease, feed costs and price uncertainty, but it can reduce dependence on a single seasonal source.

3.2 Linkages with Crop Agriculture

Crop and livestock activities create important complementarities. Crop residues can be used as feed, while animal dung can be returned to fields as organic manure. Fodder cultivation can be incorporated into farm planning, and livestock ownership can make productive use of labour at times when crop operations are less intensive. These linkages are particularly valuable where farm sizes are small and efficient use of household resources is essential.

3.3 Dairying and the Problem of Rural Migration

Out-migration from hill regions has multiple causes, including education, aspirations, public services and employment opportunities. Dairy development should not be presented as a complete solution to migration. Nevertheless, a viable local dairy economy can strengthen the income base of households that remain in villages and can create jobs in collection, transport, input supply, veterinary support, processing and retail. Its contribution is therefore best understood as part of a broader strategy for local livelihood creation.

4. Cooperative Dairy Farming: Concept and Economic Rationale

4.1 Three-Tier Cooperative Logic

The cooperative dairy model generally connects producers at village level with district milk unions and an apex federation. The village society provides the first organised point of aggregation. District-level institutions can handle larger-scale chilling, processing or coordination, while the federation supports branding, marketing, procurement systems and wider institutional functions. This structure combines local ownership with economies of scale.

4.2 Reduction of Transaction Costs

A farmer selling independently must identify a buyer, transport milk, negotiate price and bear the risk of spoilage. When a cooperative collects milk at or near the village, many of these costs are shared across producers. The reduction in per-unit marketing cost is especially important where individual marketable surplus is small. Transparent weighing and quality testing can further reduce information asymmetry between buyer and seller.

4.3 Bargaining Power and Market Assurance

Perishability can weaken the bargaining position of a milk producer because the product must be sold quickly. Collective marketing can create a more predictable outlet. Regular procurement also improves the planning ability of the household: producers can make decisions about feed, herd management and small investments with greater confidence when they expect a recurring market.

4.4 Cooperative Services as Productive Infrastructure

A dairy cooperative can serve as more than a buyer. It can become a channel for cattle feed, fodder seed, training, veterinary support, artificial insemination, clean-milk practices and information. These services influence productivity and quality. UCDF reports that it operates a cattle feed factory and implements programmes related to dairy development, including women-focused and other state and central schemes. Such service functions increase the developmental significance of the institution.

5. Dairy Sector in Uttarakhand: Production Trends and Structure

5.1 Trend in Milk Production

Official animal husbandry statistics show a generally rising milk production trend in Uttarakhand over the period shown below. Production moved from 1,792.37 thousand tonnes in 2018–19 to 1,957.25 thousand tonnes in 2024–25. The decline in 2020–21 and the modest movement in some subsequent years show that growth has not been perfectly linear. This is economically important because dairy policy must focus on resilience and productivity rather than assuming automatic year-on-year expansion.

Year	Milk production ('000 tonnes)
2018-19	1,792.37
2019-20	1,844.71
2020-21	1,797.45
2021-22	1,856.27
2022-23	1,858.55
2023-24	1,897.84
2024-25	1,957.25

Table 1. Milk production in Uttarakhand, 2018–19 to 2024–25

Source: Department of Animal Husbandry and Dairying, Basic Animal Husbandry Statistics 2025

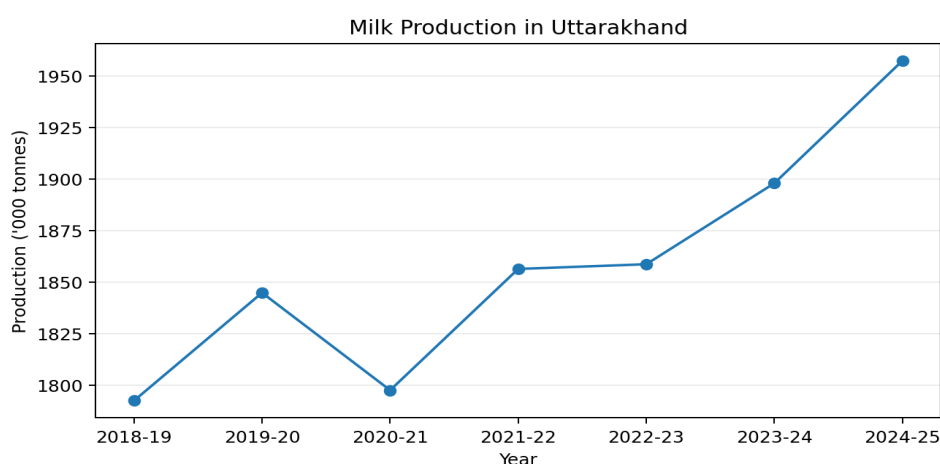


Figure 1. Milk production trend in Uttarakhand

5.2 Interpretation of the Trend

Between 2018–19 and 2024–25, the increase in milk production was approximately 164.88 thousand tonnes, or about 9.2 per cent over the period. This expansion suggests a growing production base, but aggregate output does not reveal how gains are distributed among producers. Rural development depends on whether small households participate in the organised market, whether the farm-gate return covers rising input costs, and whether higher production is accompanied by better productivity per animal.

5.3 Production, Procurement and Value

Three indicators must be distinguished: milk production, cooperative procurement and value realised from dairy products. A state may produce a large volume of milk while only part of it enters organised cooperative channels. Similarly, procurement volume does not automatically maximise producer welfare unless the system controls collection costs, rewards quality and develops profitable markets. For this reason, production growth should be linked to improvements in procurement density, processing efficiency and value-added sales.

6. UCDF, Aanchal and the Cooperative Institutional Network

6.1 Institutional Development

UCDF was established in 2001 after the formation of Uttarakhand and acts as the apex federation of district milk cooperative unions. Its registered brand, Aanchal, provides a common market identity for cooperative dairy products. According to UCDF, the federation's network covers all 13 districts through 11 district-level member cooperative milk unions. This structure is important because a state-level brand can connect dispersed rural producers with larger consumer markets.

6.2 Functions of the Cooperative Network

The cooperative network performs functions at several stages of the dairy value chain. At producer level, societies can organise milk collection and member services. District unions can coordinate chilling, processing and local distribution. The apex federation can support branding, product development, marketing, training and programme implementation. By dividing responsibilities across levels, the system can combine local participation with professional functions that require scale.

6.3 Aanchal as a Rural–Urban Link

A recognised brand converts raw milk into a product that can be sold in organised retail markets. This creates a rural–urban economic link: value originates with the milk producer but is enhanced through testing, chilling, processing, packaging, logistics and marketing. The stronger this chain becomes, the greater the possibility of retaining value within producer-linked institutions rather than leaving farmers dependent on informal intermediaries.

7. Contribution to Rural Income, Employment and Local Multipliers

7.1 Regularity of Household Income

One of the strongest economic arguments for dairying is the frequency of cash flow. Crop income is commonly realised after harvest, while milk can generate daily or periodic payments. This regularity helps households meet recurring expenditure on food, education, health, transport and farm inputs. For a small farmer, the stability of cash flow can be as important as the annual amount earned.

7.2 Direct and Indirect Employment

Dairy farming absorbs labour in feeding, fodder collection, cleaning, milking and animal care. The organised value chain creates additional work in collection centres, milk testing, transportation, chilling, processing, packaging, distribution, retailing, veterinary services and feed supply. These indirect activities are important because rural development requires non-crop employment as well as higher farm output.

7.3 Local Multiplier Effect

Income earned from milk is often spent within or near the rural economy. Expenditure at local shops, on feed, transport, repairs, education or services becomes income for other households and enterprises. This produces a multiplier effect. The strength of the multiplier depends on how much dairy income is retained and spent locally. Local processing, input supply and service enterprises can therefore magnify the impact of primary milk production.

7.4 Asset Formation and Household Resilience

Milch animals are productive assets. When dairy income is stable, households may reinvest in better animals, sheds, fodder, equipment or education. Cooperative access to services can improve the productivity of these assets. At the same time, livestock ownership can provide a degree of economic security, although distress sale of animals during shocks remains a risk. Strong animal-health and insurance mechanisms can improve this resilience function.

8. Women's Participation and Inclusive Rural Development

8.1 Women's Role in Dairy Production

Women perform a substantial share of daily livestock work in many rural households, particularly feeding, fodder management, cleaning, milking and animal care. In hill agriculture, this contribution is especially significant because male out-migration can increase women's responsibility for farm and livestock activities. The economic value of this work should be recognised in cooperative membership and decision-making structures.

8.2 From Labour Contribution to Economic Agency

Participation in production does not automatically create economic empowerment. The developmental effect is stronger when women are registered members, receive or control payments, attend cooperative meetings, access training and hold leadership positions. Direct participation can improve financial inclusion and strengthen women's role in household economic decisions.

8.3 Women-Focused Cooperative Development

UCDF identifies the Women Dairy Development Programme among the schemes implemented through the cooperative system. Such programmes can be strengthened by linking membership with practical services: bank accounts, digital payments, training in animal nutrition, bookkeeping, quality management and enterprise development. Women-led groups can also participate in value-added products, local retailing and community fodder initiatives.

8.4 Inclusive Growth

Dairying has an inclusive potential because participation does not require large landholdings. Small producers can enter the market with one or a few animals, although profitability depends on productivity and input costs. Cooperative aggregation can make these small quantities commercially relevant. This feature makes dairy cooperatives suitable instruments for a development strategy that seeks broad-based rather than highly concentrated gains.

9. Market Access, Value Addition and Agricultural Diversification

9.1 Market Access in Hill Areas

Distance and terrain increase the cost of collecting perishable milk. A viable procurement system therefore requires carefully planned routes, collection timing, chilling and sufficient volume density. Village collection points reduce the distance individual farmers must travel and can improve participation by households with small surpluses.

9.2 Value Addition

Raw milk is only one part of the dairy market. Processing into curd, paneer, ghee, butter, flavoured products and other items can extend shelf life and increase value per unit of milk. Value addition also diversifies demand. A cooperative that depends only on liquid milk may be more exposed to local demand fluctuations than one with a balanced product portfolio.

9.3 Tourism and Regional Branding

Uttarakhand's pilgrimage and tourism economy creates demand from hotels, restaurants, institutions and visitors. Cooperative dairies can explore stronger supply relationships with these markets. Products associated with regional identity, such as high-quality hill ghee or other differentiated dairy products, may also support premium branding when quality, traceability and food safety are consistently maintained.

9.4 Agricultural Diversification

Dairy income complements crop, horticulture, wage and non-farm income. A diversified household portfolio reduces dependence on one source and can smooth consumption across seasons. At the regional level, a stronger dairy value chain also broadens the economic base by creating processing and service activities outside primary crop cultivation.

10. Government Programmes and Institutional Support

10.1 National Programme for Dairy Development

The National Programme for Dairy Development supports organised milk procurement, milk testing, processing, chilling and related dairy infrastructure. For a hill state, these investments are particularly relevant because high

collection costs and dispersed settlements can make private infrastructure less attractive. Public support can help overcome initial coordination and capital constraints.

10.2 National Dairy Development Board

The National Dairy Development Board has historically supported producer-owned dairy institutions, cooperative development, productivity improvement and dairy value chains. The broader Indian cooperative dairy experience demonstrates that smallholder production can be integrated with large-scale processing and marketing when institutions are designed around aggregation and producer participation.

10.3 State and Cooperative Programmes

UCDF reports implementation of programmes such as the Intensive Dairy Development Programme, Rashtriya Krishi Vikas Yojana, National Programme for Dairy Development, Mini Dairy, Big Dairy and Women Dairy Development Programme. The federation also describes support through cattle feed, fodder seed and veterinary-related services. The effectiveness of these programmes depends on coordination: credit without a market, production without chilling, or procurement without productivity improvement can produce weak results.

10.4 Need for Convergence

Dairy policy intersects with rural roads, electricity, digital connectivity, banking, women's self-help groups, skill development and tourism. Convergence among these sectors can reduce the cost of dairy development. For example, improved rural roads lower collection costs, reliable electricity supports chilling, digital connectivity improves payment transparency and tourism expands demand.

11. Major Challenges, SWOT Analysis and Policy Recommendations

11.1 Major Challenges

The cooperative dairy sector in Uttarakhand faces a combination of production, infrastructure and institutional constraints. Difficult terrain raises transport costs. Fodder shortages and feed prices affect profitability. Veterinary access can be uneven in remote locations. Small marketable surpluses raise the cost of collection per litre. Cold-chain gaps can affect quality, while weak governance or delayed payments can reduce member confidence. Another important challenge is productivity. Increasing animal numbers without improving yield can increase feed demand and environmental pressure without proportionate income gains. Breed improvement must therefore be accompanied by balanced nutrition, disease prevention and management suited to local conditions. Climate variability may further affect water and fodder availability.

11.2 SWOT Analysis

Strengths	Weaknesses
Established cooperative network; Aanchal brand; recurring demand for milk; suitability for smallholders; strong role of family labour and women.	Difficult terrain; fragmented supply; fodder constraints; variable productivity; high collection cost; uneven access to services.
Opportunities	Threats
Value-added products; tourism demand; digital payments; women-led enterprises; solar chilling; regional branding; youth entrepreneurship.	Rising feed costs; animal disease; climate stress; competition; rural out-migration; weak member participation if returns are inadequate.

Table 2. SWOT analysis of cooperative dairy farming in Uttarakhand

11.3 Policy Recommendations

- **Expand viable village-level cooperative coverage.** Priority should be given to villages where producer density and transport conditions can support regular procurement. In very remote areas, cluster-based collection and flexible transport solutions may be more efficient than uniform infrastructure.

- **Improve productivity per animal.** Breeding services, preventive health care, balanced feeding and farmer training should be integrated. Productivity improvement raises output without requiring proportionate expansion of herd size.
- **Build fodder security.** Community fodder plots, fodder banks, silage, improved grasses and better use of crop residues can reduce seasonal feed stress. Fodder planning should reflect hill agro-climatic conditions.
- **Strengthen cold-chain and collection logistics.** Small chilling units, route optimisation and reliable power can reduce spoilage and preserve quality. Solar-supported chilling may be useful where grid reliability is weak.
- **Deepen women's ownership and leadership.** Women who perform livestock work should have greater access to formal membership, direct payments, training and elected positions within cooperatives.
- **Increase value addition and market diversification.** Aanchal and district unions can expand product portfolios where commercially viable and strengthen institutional sales to tourism, hospitality and urban markets.
- **Use digital systems for transparency.** Electronic milk records, quality results, payment statements and direct transfers can strengthen trust and reduce disputes. Digital tools should remain simple enough for widespread member use.
- **Promote youth entrepreneurship.** Young people can participate not only as dairy farmers but also in feed supply, transport, equipment maintenance, veterinary support, local processing and retail.
- **Improve cooperative governance.** Regular audits, member education, timely disclosure, professional management and democratic participation are necessary for long-term institutional credibility.
- **Measure development outcomes, not only milk volume.** Monitoring should include producer income, payment regularity, women's membership, productivity, procurement coverage, value addition and service access. These indicators better capture the rural development contribution of cooperative dairying.

12. Conclusion

Cooperative dairy farming has a strong economic rationale in Uttarakhand because it addresses two realities at the same time: production is dispersed among many small rural households, while efficient marketing and processing require scale. The cooperative structure bridges this gap by aggregating milk, organising services and connecting producers with larger markets. The state's milk production trend indicates a substantial production base. Official statistics record 1,957.25 thousand tonnes of milk in 2024–25, compared with 1,792.37 thousand tonnes in 2018–19. The developmental meaning of this output, however, depends on the terms on which farmers participate in the value chain. Regular procurement, transparent quality testing, timely payments, affordable feed, veterinary support and efficient transport are central to whether dairy growth translates into higher rural welfare.

Dairying can contribute to income diversification, labour absorption and local demand. Its recurring cash flow is particularly valuable for households whose crop income is seasonal. The sector also creates indirect employment in collection, transport, processing, input supply and retail. These linkages allow dairy income to circulate through the local economy and generate multiplier effects. Women's participation is a critical dimension of inclusive development. Because women undertake much of the routine livestock work, cooperative membership and direct economic participation can help convert labour contribution into greater financial agency. Women-focused dairy institutions should therefore be treated as a core economic strategy rather than a peripheral welfare measure.

The next stage of cooperative dairy development in Uttarakhand should focus on productivity, value addition and institutional quality. Better fodder systems, veterinary access, digital transparency, hill-appropriate cold chains, youth enterprise and tourism-linked markets can increase returns from the existing production base. Strong

governance is equally important because the cooperative model depends on producer confidence and active membership. Cooperative dairying is therefore best understood as a rural development institution rather than merely a mechanism for selling milk. When small producers collectively gain access to services, technology, processing and markets, dairy farming can support a more diversified, resilient and inclusive rural economy in Uttarakhand.

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