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From Dairy to Entrepreneurship: Empowering Rural Women through Livestock-Based Value Addition

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Abstract:

Dairy farming is one of the most important livelihood activities in rural India, but the economic contribution of milk can extend far beyond the sale of raw milk. When rural women convert milk into paneer, curd, ghee, butter, khoa, sweets, flavoured dairy products and other value-added foods, livestock production can become a pathway to entrepreneurship, household income and social empowerment. This article examines dairy-based value addition from a Home Science and Animal Husbandry perspective, focusing on the role of women, Self-Help Groups (SHGs), skill development, food safety, product diversification, local marketing and rural enterprise development. Women are deeply involved in feeding, milking, cleaning, calf care, milk handling and household-level processing, yet their contribution is often insufficiently recognised as entrepreneurship. Evidence from ICAR initiatives shows that organised women's groups can successfully undertake milk collection, processing, packaging, accounting and marketing, with training and market linkages supporting additional income generation. The article discusses how simple value-addition technologies can reduce dependence on raw-milk prices, improve product shelf life and create opportunities for local brands. It also highlights the importance of hygienic milk production, quality control, packaging, financial literacy, digital marketing and veterinary support. A coordinated approach involving veterinary institutions, Home Science departments, Krishi Vigyan Kendras, dairy cooperatives, SHGs, banks and rural-development agencies can help transform household dairy work into sustainable micro-enterprises. Dairy-based entrepreneurship should therefore be viewed not only as an economic activity but also as a practical route towards women's empowerment, nutrition security, local employment and resilient rural livelihoods.

Keywords: Dairy entrepreneurship; Rural women; Value addition; Self-Help Groups; Home Science; Animal Husbandry; Milk products; Women empowerment; Rural livelihoods; Food safety

1. Introduction:

Livestock and dairy production occupy a central place in rural livelihoods. For millions of rural households, a few dairy animals provide regular access to cash through milk sales while also supplying milk for household consumption. Unlike many agricultural crops, milk can generate income on a daily

basis. This regularity makes dairy particularly relevant to households that need frequent cash for food, education, healthcare and other expenses.

Women are central to this system. In many rural communities, women undertake a large share of routine dairy activities, including feeding animals, cleaning sheds, collecting fodder, milking, caring for calves, observing animal health and handling milk. FAO identifies rural women as important actors in daily animal care, processing, marketing and preservation of livestock diversity. However, women's contribution does not always translate into ownership, control over income or formal recognition as entrepreneurs.

Value addition provides an important opportunity to change this situation. Instead of selling all milk as a raw commodity, a household or women's group can process part of its production into products with higher unit value. Paneer, curd, ghee, butter, khoa, sweets and other products can be prepared at different scales according to local demand, available skills and investment capacity. Such processing can also help manage surplus milk during periods of high production.

The concept is particularly relevant to Home Science because it combines nutrition, food processing, hygiene, household resource management, entrepreneurship and consumer behaviour. It is equally relevant to Animal Husbandry because the quality and quantity of milk depend on animal health, nutrition, breeding, housing and hygienic milking practices. The strongest model therefore connects these disciplines rather than treating them as separate fields.

This article explores how dairy value addition can become a practical pathway from livestock care to entrepreneurship, particularly through women-led SHGs and village-level enterprises.

2. From Milk Production to Value Addition:

Raw milk is highly perishable. It requires timely cooling, clean handling and appropriate marketing. A producer who has access only to a raw-milk market may have limited control over price and may be forced to sell quickly. Value addition creates additional options.

Paneer is a familiar example. Milk is coagulated; the curd is separated, pressed and packed. Curd can be produced using controlled fermentation and sold in household-sized containers. Ghee can be produced from cream or butter using traditional or improved processing methods. Butter, khoa and traditional sweets provide further opportunities depending on local demand. Modern enterprises can also explore flavoured yoghurt, probiotic products, milk-based beverages and region-specific dairy foods, subject to appropriate food-safety requirements.

Value addition does not automatically mean large-scale industrial processing. A small group of women can begin with a limited product range, simple equipment and a local customer base. The objective is to identify products that can be produced safely and consistently with the available milk supply.

Product selection should consider several factors: local consumer preference, raw-material

availability, processing time, shelf life, equipment requirements, packaging cost, labour availability and expected selling price. A product that looks attractive but requires expensive cold-chain infrastructure may not be suitable for a small village enterprise. Conversely, a product with strong local demand and manageable processing requirements can provide a practical starting point.

Home Science professionals can contribute by training women in standardised recipes, portion control, hygiene, packaging, nutrition labelling principles and consumer-oriented product development. Veterinary and dairy professionals can contribute through clean milk production, animal health, mastitis prevention, feed management and quality assurance. The integration of these skills can improve both the raw material and the finished product.

3. Women's Invisible Work in Dairy Farming:

The first step towards women's entrepreneurship is recognising the economic value of work that is often described simply as household activity. Feeding an animal, cleaning its shed, milking it, preparing feed, caring for calves and handling milk all require time and skill. When the same work contributes to a commercial product, it becomes part of an enterprise.

The distinction between "helping the family" and "being an entrepreneur" can be influenced by control over assets, finance and decisions. A woman may spend several hours each day in dairy activities but have limited authority over how milk income is used. Organised value addition can provide a mechanism for increasing participation in financial decisions.

Entrepreneurship also involves more than production. A successful dairy enterprise needs someone to procure or collect milk, maintain records, purchase ingredients and packaging, process products, ensure cleanliness, calculate costs, manage customers, market the product and handle accounts. SHGs can divide these responsibilities among members.

ICAR has documented women-led dairy SHG initiatives in which different members handled milk collection, product preparation, packaging, marketing and accounts. Such division of labour makes it possible for women with different interests and skills to participate in the same enterprise. Training and market linkages can further strengthen sustainability.

Recognition is therefore important. Women should not be considered only beneficiaries of dairy schemes. They can be producers, processors, managers, marketers and business owners. This shift in perspective is central to meaningful empowerment.

4. Self-Help Groups as a Business Platform:

A Self-Help Group provides a practical organisational structure for women who may find it difficult to establish a business individually. Members can pool savings, share responsibilities, access training and develop collective purchasing and marketing strategies. Group activity can also reduce the risk associated with starting a new enterprise.

The strength of an SHG-based dairy enterprise lies in specialisation. One member may be particularly skilled in product preparation, another in bookkeeping, another in packaging and another in customer relations. Veterinary-related responsibilities can be coordinated with local veterinary institutions. This structure allows the enterprise to function as a small business rather than as an informal household activity.

ICAR's National Dairy Research Institute has documented women's dairy SHGs involved in products such as paneer, ghee, khoa and Gulab Jamun. The initiative included training, demonstrations, market linkages and support involving rural-development and financial institutions. Such experiences illustrate that skill training alone is not enough; enterprise development also needs finance, markets, organisation and follow-up support.

Government programmes can support this ecosystem. The Government of India has recognised SHGs and other producer organisations within dairy-development and infrastructure initiatives, while DAY-NRLM provides a broader institutional framework for rural women's SHGs. The practical challenge is connecting these programmes with local opportunities.

An SHG should therefore be encouraged to prepare a simple business plan before starting. The plan can identify the product, daily milk requirement, processing capacity, equipment, packaging, labour, expected customers, selling price, estimated costs, record-keeping system and emergency arrangements.

5. Skill Development: Where Home Science and Veterinary Science Meet

Training is one of the most important investments in dairy entrepreneurship. A woman who knows how to prepare paneer at home may still require additional training to produce a consistent commercial product. Commercial consistency means that taste, texture, weight, appearance and hygiene should remain reasonably uniform from one batch to another.

Home Science departments can play a major role in this process. Training can cover food composition, nutrition, recipe standardisation, preservation principles, sanitation, packaging, costing, consumer preferences and product presentation. Practical demonstrations are especially valuable because many women learn effectively through hands-on activities.

Veterinary institutions contribute at the beginning of the value chain. Healthy animals are more likely to produce good-quality milk. Balanced nutrition, clean housing, mastitis control, vaccination, disease prevention and proper milking practices all influence milk quality and productivity. Veterinary professionals can therefore become important partners in women's dairy entrepreneurship.

Krishi Vigyan Kendras and agricultural universities can act as bridging institutions. They can organise demonstrations, provide technical guidance and connect groups with research-based technologies. In Rajasthan, ICAR has documented a women's dairy enterprise intervention in Jaipur district involving SHGs, scientific dairy-management training, milk collection and market linkage.

The most effective training model is continuous rather than one-time. Initial training can be followed by refresher programmes, troubleshooting visits, business mentoring and quality audits. Women entrepreneurs also benefit from exposure visits to successful dairy units because seeing a functioning enterprise can make the business model more understandable and achievable.

6. Milk Products with Entrepreneurial Potential:

Different dairy products provide different entrepreneurial opportunities.

Paneer is attractive because it is widely consumed and can be produced in relatively small batches. However, it requires careful attention to milk quality, coagulation, pressing, cooling, packaging and storage.

Curd and yoghurt have strong household demand and can be sold in small containers. Consistent starter culture use, temperature control, cleanliness and cold storage are important for quality.

Ghee has a longer shelf life than many fresh dairy products and is culturally important in many Indian households. Its production can provide an option for converting cream or butter into a storable product, but quality, moisture control, packaging and adulteration prevention are essential.

Butter can be sold as a fresh product, while khoa and traditional sweets can create opportunities during festivals, marriages and local events. Products such as Gulab Jamun, Rasgulla-type sweets, peda and regional milk sweets may provide higher value when linked to local demand.

The best product portfolio depends on the local market. A village enterprise should not attempt to manufacture every possible product. It may be better to begin with one or two products, establish quality and customer trust, and expand gradually.

Seasonality can also influence product selection. Demand for sweets may rise during festivals and social functions, while curd and paneer may have more regular demand. A flexible enterprise can adjust production accordingly.

Brand identity can differentiate a small enterprise. A simple name, clean packaging, consistent weight, contact information and clear product description can make a local product appear more professional. Digital photographs and WhatsApp-based ordering can further expand the customer base.

7. Food Safety and Hygienic Milk Production:

Value addition creates economic opportunity only when products are safe. Food safety must therefore be treated as a core business principle rather than as an additional requirement.

Milk can become contaminated at several points: during milking, through dirty utensils, contaminated water, poor hand hygiene, improper storage or unsafe transportation. Animal health problems can also affect milk quality. Clean milk production begins with healthy animals and continues through hygienic milking and rapid handling.

Women entrepreneurs should develop simple Standard Operating Procedures for cleaning utensils,

personal hygiene, milk filtration, heating or processing, cooling, packaging and storage. Equipment should be appropriate for food use and easy to clean. Water quality must receive particular attention.

The enterprise should maintain basic records of production batches, raw milk received, products prepared, packaging used and complaints received. Such records help identify problems and build customer confidence.

Food businesses must also comply with applicable food-safety and regulatory requirements. Depending on the scale and product, entrepreneurs may need appropriate registration, licensing, labelling and hygiene practices. Women's groups should receive practical guidance on these requirements rather than being left to interpret complicated procedures independently.

Food safety also has a marketing advantage. Consumers increasingly value products that are clean, authentic and trustworthy. A local enterprise that consistently demonstrates hygienic production can build a strong reputation through word-of-mouth and repeat purchases.

8. Costing, Pricing and Financial Literacy:

Many small enterprises fail not because the product is poor, but because costs are not calculated correctly. Dairy entrepreneurs should understand the difference between sales revenue and profit.

For a simple product, total cost can include milk, ingredients, fuel or electricity, labour, packaging, transport, equipment depreciation, refrigeration, marketing and wastage. If the value of family labour is ignored, the apparent profit may be misleading.

Women's groups should maintain a daily or weekly record of milk quantity, product quantity, sales, expenses and cash balance. Basic bookkeeping can reveal which products are profitable and which require adjustment.

Pricing should consider both cost and market demand. A very low price may increase sales but reduce the ability of the enterprise to replace equipment or compensate workers. A very high price may limit demand. Packaging size can provide flexibility: small affordable packs can serve local households, while larger packs may be suitable for functions or institutional buyers.

Financial literacy also includes understanding loans, savings, repayment schedules and working capital. SHGs can support collective savings and internal lending, while banks and rural-development institutions may provide formal finance subject to eligibility.

A business should maintain an emergency reserve because milk supply, demand and product prices can fluctuate. Gradual expansion is generally easier to manage than purchasing expensive equipment before a stable market has been established.

9. Marketing: From Village Customers to Digital Markets

Marketing is often the weakest part of a small rural food enterprise. Producing a good product does not guarantee that customers will find it. Women entrepreneurs therefore need basic skills in customer

communication, packaging, branding and promotion.

The first market is usually local. Villagers, nearby shops, schools, offices, hospitals, community events and social functions can provide regular or seasonal demand. Local fairs and exhibitions can also help establish a customer base.

SHGs can collectively negotiate with shops, caterers and institutions. Group-level marketing may reduce transport costs and provide more consistent supply.

Digital tools offer new opportunities. WhatsApp Business or similar platforms can be used for product catalogues, order collection and customer communication. Social-media photographs can show packaging and preparation without making exaggerated claims. Digital payments can simplify transactions and record sales.

Branding should communicate a clear identity. A product name, simple logo, packaging information and contact number can make a small enterprise easier to remember. Claims about health or nutrition should be truthful and appropriately supported.

Trust is especially important for food products. Customers may continue buying from a small enterprise because they know the producer, can observe its reputation and value freshness. Maintaining quality is therefore one of the most powerful forms of marketing.

10. Income Generation and Women's Empowerment:

The economic value of dairy entrepreneurship extends beyond the profit from a single product. Income can support household nutrition, education, healthcare, savings and asset creation. It can also strengthen a woman's role in household financial decisions.

Research on dairy SHGs has reported positive associations between organised dairy activities, income and employment. ICAR documentation from Haryana describes women's groups generating additional income through value-added dairy products and participating in fairs and local markets. Another ICAR study from Jaipur district reported positive effects of SHG-linked dairy financing on income and employment indicators.

These examples should not be interpreted as guarantees of profit for every group. Outcomes depend on milk availability, market demand, management quality, training, finance, local competition and product quality. Nevertheless, they demonstrate the feasibility of the model under supportive conditions. Empowerment is multidimensional. Economic empowerment can include control over income, participation in financial decisions, confidence in dealing with markets and improved access to institutions. Social empowerment can involve greater visibility in community activities and recognition of women's productive skills.

Dairy entrepreneurship can also create employment for other women. Processing, packaging, bookkeeping, delivery and marketing can become separate roles as an enterprise grows.

For these reasons, value addition should be considered not simply as a method for increasing milk prices but as a pathway for building women-led rural enterprises.

11. Role of Veterinary Services in Supporting Dairy Entrepreneurs:

A dairy value-addition enterprise depends on a reliable supply of good-quality milk. Veterinary services therefore have an indirect but important role in entrepreneurship development.

Animal health affects milk yield, reproductive performance and the continuity of milk supply. Disease prevention, vaccination, mastitis control, deworming where appropriate, balanced nutrition and timely treatment can protect the productive capacity of dairy animals.

Veterinary officers and extension workers can also educate women about observing early signs of illness, maintaining hygienic milking practices and preventing disease transmission. When women are directly involved in daily animal care, extension programmes should deliberately include them.

Artificial insemination, breeding advice and calf management can contribute to long-term productivity, but genetic improvement should be combined with adequate nutrition and management. A productive animal still requires appropriate feed, water, housing and health care.

Veterinary institutions can collaborate with Home Science departments to conduct integrated dairy-enterprise camps. Such programmes could include animal-health examination, clean-milk demonstrations, dairy-product preparation, costing exercises and market planning in the same event.

This integrated model can make extension more relevant to household realities. Instead of discussing animal health separately from income, professionals can show how prevention of disease protects the raw material needed for a women-led dairy enterprise.

12. Challenges Faced by Rural Women Entrepreneurs:

Despite the potential of dairy entrepreneurship, women may face several constraints. Access to credit can be limited, particularly when women have limited ownership of productive assets. Time constraints can also be significant because dairy activities are often combined with household responsibilities.

Mobility and market access can present additional barriers. Women may have difficulty travelling to distant markets, attending training or negotiating with buyers. Digital literacy can also vary.

Technical challenges include inconsistent milk quality, limited refrigeration, lack of suitable equipment and inadequate knowledge of food safety. Business challenges include uncertain demand, competition from established brands, packaging costs, transportation and weak bookkeeping.

Institutional fragmentation can make support difficult to access. A woman may need animal-health support from one institution, food-processing guidance from another, credit from a bank and marketing assistance from a rural-development agency. Without coordination, the entrepreneur may have to navigate several systems independently.

Training programmes should therefore be designed around real constraints. Childcare or flexible training schedules may improve participation. Local-language materials and practical demonstrations can make technical information easier to use. Market-oriented training should accompany production training. Successful entrepreneurship also requires patience. A new group may need time to establish customer trust, refine products and learn from mistakes. Follow-up support is often more valuable than a single training event.

13. A Practical Model for a Women-Led Dairy Enterprise:

A practical village-level model can begin with a group of interested women who already have access to dairy animals or local milk suppliers. The first stage is group formation, savings and a basic assessment of milk availability.

The second stage is training. Members can receive instruction in clean milk production, animal health, processing, food hygiene, packaging, costing and bookkeeping. The group should select one or two products based on local demand.

The third stage is pilot production. Small batches can be sold within the village or at a local event. Customer feedback should be recorded. Product quality, shelf life, packaging and price can then be adjusted.

The fourth stage is market expansion. The group can approach local shops, institutions, caterers and community events. Digital ordering can be introduced after production and quality become stable.

The fifth stage is formalisation and scaling. Depending on the business model and applicable rules, the group can explore appropriate registration, food-related compliance, branding, bank finance and equipment upgrades.

Throughout the process, veterinary and Home Science support should continue. Veterinary professionals protect animal health and milk supply, while Home Science and food-technology professionals strengthen processing, nutrition, hygiene and consumer orientation.

The model can be represented as:

Healthy animals → hygienic milk → value addition → safe packaging → local branding → market linkage → income → reinvestment → stronger livestock enterprise.

This cycle illustrates how animal husbandry and Home Science can jointly create rural entrepreneurship.

14. Future Opportunities:

Future opportunities lie in moving from traditional products to differentiated, quality-oriented local brands. Consumers may be interested in regional dairy foods, convenient products, hygienically packaged traditional sweets and products with a transparent local identity.

There is also scope for institutional markets. Schools, offices, hospitals, tourism establishments, community events and local retailers can become customers where procurement requirements can be met.

Training in digital marketing and financial management can help younger rural women enter dairy entrepreneurship. Youth involvement can complement the practical livestock knowledge of older household members with skills in branding, photography, online communication and bookkeeping.

Climate resilience should also be integrated into enterprise planning. Water availability, fodder costs, heat stress and disease risks can affect milk supply. Enterprises that maintain diversified products and strong local relationships may be better positioned to manage fluctuations.

Collaboration with universities, veterinary colleges, Krishi Vigyan Kendras, dairy cooperatives, SHG federations, banks and rural-development institutions can create a stronger support ecosystem. Research institutions can help evaluate new processing technologies and market opportunities.

The long-term goal should not be simply to create more small businesses, but to create enterprises that are safe, financially viable, environmentally responsible and capable of improving the quality of life of participating families.

15. Conclusion:

Dairy farming can be much more than the sale of raw milk. Through value addition, milk can become paneer, curd, ghee, butter, khoa, sweets and a wide range of other products that create opportunities for rural entrepreneurship. For women, this transition can provide a pathway from unpaid or under-recognised household labour toward greater economic participation and enterprise ownership.

Self-Help Groups provide an especially useful platform because they allow women to pool resources, divide responsibilities, access training and build collective market relationships. Evidence from ICAR and other research demonstrates that women-led dairy groups can undertake processing and marketing activities when supported by training, finance and institutional linkages.

The role of Home Science is central because entrepreneurship depends on food processing, nutrition, hygiene, consumer awareness, resource management and product development. Animal Husbandry is equally important because healthy animals, good nutrition, disease prevention and clean milk are the foundation of the value chain.

The most effective approach is therefore interdisciplinary. Veterinary institutions, Home Science departments, rural-development agencies, SHGs, dairy organisations, financial institutions and local markets should work together. With appropriate skills, safe processing, sound bookkeeping, market awareness and sustained institutional support, a small quantity of milk can become the foundation of a viable rural enterprise.

Empowering rural women through dairy value addition is ultimately an investment in households, communities and the livestock sector itself. When women gain skills, income and greater control over enterprise decisions, the benefits can extend to nutrition, education, savings, employment and resilience. The journey from dairy to entrepreneurship is therefore not merely a change in product form—it is a

change in the economic role of rural women.

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