**Constraints Faced by Dairy Farmers in the Kumaon Region of Uttarakhand: An Analytical Study**

**Abstract**

*The rural economy predominantly relies on dairy as a key sector—whether to meet the food and nutritional needs of the family, supplement household income, or pursue dairy farming as a full-time occupation. Dairy farming plays a pivotal role in sustaining the economy in hilly regions like the Kumaon division of Uttarakhand, where agricultural land is fragmented and infrastructure is limited. Despite its potential to provide livelihood, nutritional security, and reduce rural outmigration, dairy farmers in the region face several challenges that hinder productivity and profitability. This study aims to identify and analyze the primary constraints encountered by dairy farmers in the Kumaon region. Using a structured survey of 100 randomly selected dairy farmers across Almora and Pithoragarh districts, data were collected and categorized into three domains: management practices, feeding, and reproduction/production-related issues. The results indicate that the most pressing constraints include lack of knowledge about modern management practices (76%), feed shortages during the dry season (84%), and post-disease productivity loss in animals (98%). The study concludes that improving extension services, feed resource management, and veterinary care are essential for addressing these challenges. Targeted policy interventions and context-specific support systems are recommended to enhance the viability and sustainability of dairy farming in the hills of Uttarakhand*.

*Keywords: Dairy farming, constraints, Kumaon, feeding, reproduction, disease, management practices*

**Introduction**

The dairy sector plays a vital role in India’s agricultural economy, serving as a major source of livelihood, nutrition, and employment for millions across the country. Animal husbandry and dairying are key contributors to the Indian economy. Livestock sector contributes 30.23% of agricultural GVA and 5.5% of the national economy (Annual Report 2024–25, Department of Animal Husbandry, Dairying and Fisheries, Government of India). Animal husbandry is a major sub-sector of agriculture sector and contributes about 28.6 per cent to the agricultural value output (Annual Report 2017–18, Department of Animal Husbandry, Dairying and Fisheries, Government of India). Total bovine population in the country has increased from 198.70 million in 1951 to 303.76 million in 2019 (GOI, 2022). Dairying is one of the most important means of providing livelihood and nutritional security to the rural masses. Milk group has predominant share (67 per cent) in the value of output from livestock sector. In the span of past 75 years, the dairy sector has come a long way registering more than 9-fold increase in milk production, from 17 million tonnes in 1950-51 to 165 million tons in 2016-17. The decadal growth rates, ranging from of 3.5-5.0 per cent during the past seven decades, have been higher than the world average growth rate of about one per cent (Department of Agriculture, GOI., 2018)

As the world’s largest producer of milk, India accounts for more than 20% of global milk production. This growth is not merely a statistical achievement; it reflects the strength of millions of small and marginal farmers whose daily lives revolve around dairying. Milk production significantly contributes to agricultural GDP and provides a regular, year-round source of income, which is particularly valuable in rural economies where crop income is often seasonal and uncertain.

Beyond economic benefits, dairy farming ensures food and nutritional security. Milk is a key source of high-quality proteins, calcium, vitamins, and other essential nutrients for a large segment of the Indian population. In a country where malnutrition and undernourishment still persist in certain regions, the nutritional value of dairy products becomes crucial. Furthermore, the dairy sector plays an important social role by empowering women, especially in rural India. Women are deeply involved in animal care, feeding, milking, and other aspects of animal husbandry, often managing these responsibilities alongside household duties. Their participation not only enhances household income but also promotes greater gender equity and decision-making power within families and communities.

The rural economy predominantly relies on dairy as a key sector—whether to meet the food and nutritional needs of the family, supplement household income, or pursue dairy farming as a full-time occupation. Despite its successes, the industry faces challenges such as feed shortages and maintaining milk quality and quantity, particularly during environmental crises like droughts or floods (Food Policy, 2021). Output growth can be achieved by provisioning of adequate quality inputs and services. The contribution of technology in enhancing yield is channelized through improvement in input quality and management practices. There are several region-specific dimensions of existing challenges for enhancing the milk productivity (Department of Agriculture, GOI., 2018). Kumar et al. (2021) examined the Indian livestock sector is confronted with a multitude of challenges, encompassing disease outbreaks, antimicrobial resistance, and greenhouse gas emissions, in addition to insufficient human resources and infrastructure for delivering veterinary services. Feed is important component of dairy management and is a labour intensive job faces many economical constraints. The feeding cost is highest at the dairy farm as it accounts for more than 75% of total variable cost. Second highest cost at the dairy farm was labour cost and then the other cost (Jakhar *et al*, 2020)

India dairy farming facing some challenges like low yield poor quality milk lack of infrastructure facility and more cost of animal feed and fooders ad low price for milk to analysis the milk production (Santhosha and Dhananjaya, 2022). Major issues in livestock sector are access to feed, fodder and all the more drinking water which is becoming increasingly scarce in rain-fed areas that support about 75 percent of the livestock population (NITI Aayog 2018). Addressing the challenges facing the sector and capitalizing on emerging opportunities can help the Indian livestock sector achieve its full potential and Play a essential role in driving the nation's economic progress and prosperity (Saravanaraj and Kannan, 2025). Revitalizing the industry necessitates embracing modernization in cattle farms, leveraging technology more extensively, and transitioning towards an organized approach to cattle rearing (Sri, 2024).

In the specific context of the **Uttarakhand hills**, the importance of the dairy sector becomes even more pronounced. The state's challenging geography, characterized by mountainous terrain, scattered settlements, and limited arable land, presents significant constraints to traditional agriculture. In such conditions, dairy farming emerges as a more sustainable and feasible livelihood option. Unlike large-scale farming, dairy can be practiced on small plots of land and does not demand heavy infrastructure or capital investment. Indigenous breeds of cattle and buffalo, adapted to the local climate and available fodder, are reared by smallholder farmers. These animals are hardy and require less intensive care compared to exotic breeds, making them more suitable for the hilly terrain.

Dairy farming in Uttarakhand serves multiple purposes: it supplements the household income, supports nutritional needs, and, crucially, helps curb the increasing trend of outmigration from the hills. Many young people migrate to urban areas in search of jobs, leaving behind a vulnerable and aging population. By providing a stable income source locally, dairy farming can help reverse this trend and contribute to the socioeconomic stability of hill villages. Additionally, it provides employment opportunities for women and elderly people, thereby integrating all sections of the community in productive activities. Women's central role in dairy activities—ranging from feeding animals to processing and marketing dairy products—enhances their economic independence and promotes inclusive rural development. Despite its potential, however, the dairy sector in Uttarakhand and similar hill states faces several **challenges** that hinder its growth. Limited access to markets, poor road connectivity, lack of organized collection and processing infrastructure, and inadequate veterinary services are some of the major bottlenecks. Additionally, due to the region's remoteness, farmers often lack exposure to modern dairy technologies, scientific animal care practices, and advanced breeding methods. These constraints result in lower productivity, higher input costs, and overall inefficiency in the value chain.

As India moves towards becoming a more food-secure and economically empowered nation, scientific research in agriculture and allied sectors is progressing rapidly. However, the **implementation** of this research on the ground—particularly in remote and challenging areas like Uttarakhand—often lags behind. There exists a critical gap between laboratory research and field-level adoption, commonly referred to as the "lab-to-land" gap. One of the key strategies to bridge this gap is through **constraint analysis**. Constraint analysis involves identifying the real-world problems that farmers face in adopting and adapting new technologies and practices. It is a tool that provides insight into why certain technologies are not being used as expected and what barriers prevent their effective implementation. These could be economic (e.g., lack of funds), infrastructural (e.g., poor transportation), educational (e.g., lack of awareness or training), or social (e.g., gender norms restricting women's participation). By systematically studying these constraints, researchers and policymakers can design better, more context-specific interventions that have a higher chance of success.

In the case of **Uttarakhand,** constraint analysis becomes even more critical due to the unique challenges posed by its geography and socio-economic structure. Fragmented land holdings, scattered settlements, and low accessibility make traditional agricultural practices difficult and often non-profitable. In such scenarios, an effective constraint analysis can reveal deep-rooted issues that are not immediately visible, such as poor access to veterinary care, lack of cold storage for milk preservation, or inefficient extension services. Unavailability of green fodder round the year, low productivity of animal, non-remunerative prices of milk were major three constraints faced by dairy farmers identified by Adhikari *et al* (2020) in hilly state of Uttarakahnd. Understanding these constraints can help in crafting tailored solutions—such as mobile veterinary clinics, community milk collection centers, or targeted training programs for women dairy farmers. Moreover, constraint analysis can play a pivotal role in enhancing **policy formulation**. When policies are based on real, ground-level data, they are more likely to address the actual needs of the population. For instance, government schemes promoting dairy development in hilly areas can be redesigned based on feedback from farmers about what works and what doesn’t. Similarly, financial support programs, such as subsidies or credit facilities, can be aligned better with farmers’ capacities and repayment abilities. Dairy sector holds immense promise for the socio-economic upliftment of rural India, particularly in challenging regions like the Uttarakhand hills. By providing a stable source of income, ensuring nutritional security, and empowering women, dairying contributes to inclusive and sustainable development. However, to realize its full potential, it is imperative to address the existing constraints through systematic research, effective implementation of scientific knowledge, and informed policymaking. **Constraint analysis** stands out as a crucial tool in this endeavor, helping bridge the gap between technology and practice, and ensuring that dairy farming continues to be a viable and sustainable livelihood option for future generations. Keeping in view the importance and need of constraints analysis for dairy farming in hills, the present study was planned with the following objectives:

1. To analyses the present scenario of dairy farming in India.
2. To identify the major constraints faced by dairy farmers in hills
3. To suggest possible ways to handle constraints faced by hill dairy farmers.

**Materials and Methods**

The study was conducted in the Kumaon region of Uttarakhand in 2024. Kumaon region of Uttarakhand state in India was purposely selected for the study as the researcher is well familiar with the geography and culture of the area. From Kumaon region two ditricts *viz.* Pithoragarh and Almora were selected randomly to randomly select five villages from each district and from each randomly selected village ten farmers were selected making a sample size of 100 dairy farmers to collect information on constraints perceived by the dairy farmers. Data were collected through structured interviews using a pre-tested schedule. The constraints were grouped into three categories: management practices, feeding, and reproduction/production-related issues. Each constraint was ranked based on the frequency of responses and analyzed using percentage distribution.

**Results and Discussion**

1. **Constraints in Management Practices**

Constraints related to the management of dairy farming practices were studied under four key areas: adherence to traditional management practices, lack of knowledge regarding improved practices, availability and use of manpower, and water scarcity. The findings related to these constraints have been summarized and presented in Table 1. Among general management challenges, the most frequently reported issue was **lack of knowledge about improved practices** (76%), followed by **dependence on traditional methods** (72%). Labour scarcity (56%) and water availability issues (52%) were also significant concerns (Table 1). Similar results were reported by Reddy *et al* (2024), Kumar *et al* (2024), Gour (2002) and Shrivstava (2003).

1. **Feeding Constraints**

Providing the right feed to dairy animals at the right time is essential for maintaining productivity and profitability in the dairy business. However, farmers often face multiple feeding-related constraints. In the present study, key challenges such as the seasonal availability of feed, feed shortages during the dry season, high cost of concentrate feed, and limited availability of land for fodder cultivation were examined and analyzed in depth. The results related to these feeding constraints are presented in Table 1. Feeding constraints were critical during the dry season, with **feed shortages** being the most reported issue (84%), followed by **seasonal feed availability** (82%). Other notable problems were **high costs of concentrate feed** (80%) and **limited land for fodder production** (78%). Similar observations were reported by Reddy *et al* (2024), Gamit *et al* (2021)

1. **Reproduction and Production Constraints**

Animal health and reproduction constitute a critical component of the dairy farming system, directly influencing the overall efficiency and profitability of dairy enterprises. In the present study, key constraints affecting this domain were examined, including the high frequency of diseases, reduced productivity following illness, low success rates of artificial insemination (AI), and a high incidence of reproductive problems such as repeat breeding and anoestrus. The results pertaining to these constraints are systematically presented in Table 1. The **low productivity of dairy animals post-disease** was reported by 98% of respondents, making it the top constraint overall. This was followed by a **high frequency of disease** (89%), **reproductive problems** like repeat breeding and anoestrus (84%), and a **low success rate of artificial insemination (AI)** (82%). The problems associated with adoption of feeding and health care practices were ranked first by Singh *et. al* (2015)

Table 1: Constraints faced by dairy farmers in Kumaon Region of Uttarakhand

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Problem/Constraint | Dairy Farmers  *(n=100)* | | |
| Frequency | Percentage | Rank |
| **Management practices** | | | | |
| 1 | Following traditional management practices | 72 | 72 | II |
| 2 | Lack of knowledge about the practices | 76 | 76 | I |
| 3 | Crises of manpower in dairy farms due to labour scarcity | 56 | 56 | III |
| 4 | Water scarcity problems faced by dry areas | 52 | 52 | IV |
| **Feeding** | | | | |
| 1 | Seasonal availability of feed | 82 | 82 | II |
| 2 | Feed shortage in dry season | 84 | 84 | I |
| 3 | High cost of concentrate | 80 | 80 | IV |
| 4 | Limited availability of land for feed fodder production | 78 | 78 | III |
| **Reproduction and production diseases** | | | | |
| 1 | Higher frequency of disease in dairy animals | 89 | 89 | II |
| 2 | Low productivity of dairy animal after diseases | 98 | 98 | I |
| 3 | Higher rate of reproductive problems repeat breeding and anoestrous | 84 | 84 | III |
| 4 | Low success rate of AI | 82 | 82 | IV |

**Conclusion**

Dairy sector has been vital throughout the human history of development and always been source of food, nutrition and income. Rearing animals in any form brings pressure on resources to fulfill the need of increasing population. Such pressure become more tangible in hill terrain and it is very much required to conduct constraint analysis from time to time. Findings in the present study reveal that dairy farmers in Kumaon face multidimensional constraints, primarily stemming from knowledge gaps, feed unavailability, and disease-related productivity losses. These challenges, if unaddressed, will continue to hinder the growth of the dairy sector. The study recommends strengthening extension services, improving fodder management, and enhancing veterinary healthcare support to mitigate these constraints.

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