



International Journal of Agriculture Extension and Social Development

ISSN Print: 2618-0723
ISSN Online: 2618-0731
NAAS Rating (2026): 5.04
IJAESD 2026; 9(9): 892-896
www.extensionjournal.com
Received: 08-07-2026
Accepted: 16-08-2026
Published: 25-09-2026

The names and affiliations of all authors are provided below, following the references.

Analyzing multidimensional constraints in dairy production systems of Nagaland using Garrett's ranking technique

Janrhomo Murry¹, Neelkusum Xess², Santosh Kumar Sahoo³, Vikash Kumar⁴, Nancy Zomuanpuii⁵, Amanish Kumar⁶, Nalukurthy Nikhil⁷, Sylvia Lalhmingmawii⁸, Asif Mohammad⁹

DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i9l.4291>

ABSTRACT

Nagaland faces declining dairy yields despite large cattle populations, which may be attributed to the traditional preferences for rearing indigenous breeds for meat and social status. Understanding the constraints that limit dairy production is, therefore, crucial for formulating appropriate strategies to strengthen the dairy sector. Thus, the study was undertaken during 2025-2026 to identify and prioritise the constraints faced by dairy farmers in the selected districts of Nagaland in which a total of 160 respondents were randomly selected from Chümoukedima and Kohima districts. Data were collected through a semi-structured questionnaire and the respondents ranked the constraints they perceived in dairy farming. Garrett's ranking technique was adopted to prioritise the constraints faced by the dairy farmers in the study area. The study revealed that the major constraints faced by the dairy farmers in their respective domains were the high cost of concentrate feed (Garrett score 53.20), high cost of artificial insemination and related services (Garrett score 51.60), limited livestock disease diagnosis services (Garrett score 53.80), inadequate extension services and follow-up support (Garrett score 51.00) and absence of organised milk collection centre (Garrett score 54.80). Based on these findings, policy interventions are needed to improve veterinary and extension services, strengthen milk marketing infrastructure and ensure affordable feed and breeding services for improving dairy farming in the study area.

Keywords: Dairy Farming, Constraints, Nagaland, Garrett's Ranking Technique, Cattle

Introduction

India continues to hold its position as the global leader in milk production, contributing nearly a quarter of the world supply. Currently, dairy acts as the largest agricultural product in India, contributing 5% to the national economy. Milk production demonstrates a rise of 63.56% from 146.30 million tonnes to 239.30 million tonnes over a decade and the per capita supply exhibits a 48% increase, offering more than 471 g a day during the period from 2023 to 2024 (PIB, GOI, 2025) [1]. This trajectory continues into the period from 2024 to 2025, where production grows by 3.58% to reach 247.87 million tonnes and daily per capita milk availability rises to 485 g, exceeding the global average of 322 g (BAHS, 2025) [2]. Although India displayed remarkable progress in dairy development following the White Revolution, the hilly and peripheral regions faced severe constraints related to fodder availability, veterinary infrastructure, market access and resource scarcity. These resulted in uneven dairy progressiveness when compared to leading milk-producing states such as Punjab, Haryana and Gujarat, which exhibit highly commercialized dairy systems (Kale *et al.*, 2016) [3].

Livestock farming forms an integral part of the economy in the North Eastern hilly region of India, where high diversity in livestock composition remains a characteristic feature (Koireng *et al.*, 2018) [4]. Total milk production in the North Eastern states accounts for only 0.70% of the national production during the period from 2022 to 2023. The compound annual growth rate (CAGR) of milk among these states revealed that Mizoram experiences the highest shortfall of milk (-81.78%), followed by Nagaland (-79.54%), Manipur (-79.45%), Meghalaya (-74.26%), Assam (-74.02%), Arunachal Pradesh (-73.13%) and Tripura (-48.85%). Addressing this shortfall represents a substantial market opportunity to expand the dairy sector, thereby enhancing livelihoods, food security and socio-economic status (Mili *et al.*, 2024) [5].

Specifically, Nagaland exhibits a decline in the cattle population, marked by a negative CAGR of -7.29% compared to other North Eastern states, according to livestock census data from 1997 to 2019 (Chaudhary *et al.*, 2025) [6]. Traditionally, milk consumption is low in Nagaland, largely due to a cultural preference for meat and the non-availability of milk in sufficient quantities (Singh *et al.*, 2021) [7]. To achieve sustainable dairy development, emphasis is required to equip farmers with adequate knowledge and skills ranging from cattle rearing to marketing (Venkatasubramanian *et al.*, 2012) [8]. Although previous studies reported that the

Corresponding Author:
Asif Mohammad
ICAR-National Dairy
Research Institute, Eastern
Regional Station, Kalyani,
West Bengal, 741235, India

low price of milk, lack of green fodder, repeat breeding and improper treatment services act as the major constraints (Gamit *et al.*, 2021) [9], a comprehensive domain-wise assessment remains absent. It has been hypothesized that dairy farmers perceived constraints across feeding, breeding, healthcare, farm management and marketing as important barriers to dairy farming in the selected districts of Nagaland. To test this hypothesis, a quantitative ranking approach to assess farmers' perceptions was done. This approach is justified as it systematically quantifies field constraints to identify critical intervention areas. Therefore, the present study aims to identify and prioritise the constraints faced by dairy farmers in the selected districts of Nagaland.

Methodology

The present study was conducted in the purposively selected Chümoukedima and Kohima districts of Nagaland. From each district, 2 blocks were selected and 4 villages were selected from each block, followed by the random selection of 10 dairy farmers from each village. Consequently, a total sample of 160 dairy farmers were selected for the present study. The selection criteria of the respondents mandated at least 5 years of experience in dairy farming and a minimum holding of 2 milch animals. Data collection was done using a well-structured, pre-tested, and standardized interview schedule developed for the intended purpose and through validation from experts. A comprehensive list of commonly occurring feeding, breeding, health management, farm management, and marketing constraints in dairy farming was framed based on thorough review of the relevant literature (Singh *et al.*, 2021; Ashokbabu *et al.*, 2022; Priya *et al.*, 2025) [11, 10, 12]. The field interview was conducted from December 2025 to January 2026 and the respondents were asked to rank the given constraints in the schedule according to the degree of relevance and importance as perceived by them. Ex-post facto research design was adopted to find the answers to the current research questions. The collected data were analysed using the Garrett's Ranking Technique. By using this technique, the order of the merits given by the respondents was converted into ranks by using the standard formula:

$$\text{Percent Position} = \frac{(R_{ij} - 0.5)}{N_j} \times 100$$

Where, R_{ij} is the rank given for i^{th} factor by j^{th} individual, N_j is the number of factors ranked by j^{th} individual. The percent position obtained for each rank was then converted into scores by referring to the standard conversion table given by Garrett and Woodworth (1969). For each identified constraint, the individual scores of the respondents were aggregated and subsequently divided by the total number of respondents to determine the final mean score. Finally, these mean scores for all factors were arranged in descending order to establish the final prioritization and ranking of the constraints faced by the dairy farmers in the study area. All statistical and analytical procedures employed in the study were performed using Microsoft Excel software.

Results

Constraints imply the difficulties or problems faced by dairy farmers while adopting day-to-day animal husbandry practices in the study area and the results of the present study are presented in Tables 1 to 5.

Dairy production constraints

A consolidated analysis of the feeding constraints (Table 1) revealed that "The cost of concentrate feed is too high" (with Mean Garrett score of 53.20) as the most severe feeding constraint, followed by "Fodder and feed prices fluctuate a lot" (with Mean Garrett score of 50.20). Various constraints related to breeding of animals are given in Table 2. The overall analysis revealed that "Artificial insemination and related service costs are high" (with Mean Garrett score of 51.60)

with "Advice and guidance on breeding management are inadequate" (with Mean Garrett score of 48.20) constituted the major breeding limitations. Similarly, the health management constraints are presented in Table 3, in which "Livestock disease diagnosis services are limited" (with Mean Garrett score of 53.80) was ranked as first while "Emergency animal healthcare is not available when needed" (with Mean Garrett score of 52.00) was ranked second.

Table 1. Feeding constraints faced by dairy farmers

Feeding constraints	Mean Garrett score	Rank
The cost of concentrate feed is too high	53.20	I
Green fodder is not available year-round	46.60	VI
Dry fodder is often scarce or expensive	47.00	V
There is no community or common grazing land for animals	49.20	III
Water for animals and fodder is often scarce	46.20	VII
Farmers' knowledge of balanced ration is low	45.20	VIII
It is hard to transport feed inputs to the farm	49.00	IV
Crop residues are not available for feeding	36.20	X
Fodder and feed prices fluctuate a lot	50.20	II
Feed quality is often poor	37.00	IX

Table 2. Breeding constraints faced by dairy farmers

Breeding constraints	Mean Garrett score	Rank
AI services are not available locally	47.00	IV
The supply of semen and other breeding inputs is irregular	43.80	V
Artificial insemination and related service costs are high	51.60	I
Good-quality breeding bulls are not available nearby	47.80	III
It is difficult to detect heat in cows and buffaloes	38.20	IX
Low conception rates are common	33.20	X
Repeat breeding problems are frequent	40.20	VII
Seasonal infertility or sub-fertility occurs	38.80	VIII
There is a shortage of trained inseminators	40.80	VI
Advice and guidance on breeding management are inadequate	48.20	II

Table 3. Healthcare constraints faced by dairy farmers

Healthcare constraints	Mean Garrett score	Rank
Veterinary clinics and services are too far from the farm	49.40	IV
There is a shortage of trained veterinary staff	42.00	VIII
Medicines and vaccines are expensive for farmers	45.20	VI
Good-quality medicines are not easily available	39.60	IX
Livestock disease diagnosis services are limited	53.80	I

(continued on next page)

Healthcare constraints	Mean Garrett score	Rank
Vaccines and medicines are supplied irregularly	48.20	V
Farmers awareness of livestock diseases is low	42.60	VII
Disease outbreaks occur frequently in the area	29.00	X
Vaccination schedules are often incomplete or not followed	50.00	III
Emergency animal healthcare is not available when needed	52.00	II

Farm management constraints

A perusal of Table 4 regarding farm management constraints showed that the “Extension services and follow-up support are lacking” (with Mean Garrett score of 51.00) ranked first. This was followed by the “Government technical support is absent or very limited” (with Mean Garrett score of 48.00).

Table 4. Farm Management constraints faced by dairy farmers

Farm management constraints	Mean Garrett score	Rank
There is no adequate training in dairy management	43.40	VII
Farmers find it difficult to recruit and retain farm labour	29.80	X
The cost of farm labour is high	30.80	IX
Shed and farm housing facilities are poor	46.80	IV
Access to water or electricity at the farm is poor	46.60	V
Extension services and follow-up support are lacking	51.00	I
Farmers face difficulty in getting loans or credit	47.00	III
Dairy cooperatives or groups are not active or effective	40.00	VIII
Government technical support is absent or very limited	48.00	II
Unpredictable milk prices make farm planning difficult	44.60	VI

Marketing constraints

The perceived marketing constraints experienced by dairy farmers were presented in Table 5. Among the identified constraints, “There is no organised milk collection centre nearby” (with Mean Garrett score of 54.80) ranked first, followed by “Milk price and demand vary greatly with season” (with Mean Garrett score of 52.00).

Table 5. Marketing constraints faced by dairy farmers

Marketing constraints	Mean Garrett score	Rank
The price procured from buyers for milk is too low	45.40	VIII
Payment for milk is irregular or delayed	48.00	IV
There is no organised milk collection centre nearby	54.80	I
Middleman charge a high commission or margin	46.80	V
It is hard for farmers to get market price information	37.00	IX
Transport for milk and milk products is costly or inadequate	48.40	III

Marketing constraints	Mean Garrett score	Rank
There is no bulk chilling or storage facility for unsold milk	46.00	VII
A lot of milk or products spoil before they are sold	26.20	X
Milk price and demand vary greatly with season	52.00	II
Government support or market schemes are hard to access	46.60	VI

Discussion

Among dairy production constraints for feeding, farmers find it difficult to afford concentrate feed, as a 50 kg bag generally costs around ₹1,100 to ₹1,400 and majority of the farmers do not cultivate their own fodder crops due to the lack of manpower and owned land. Additionally, the frequent fluctuation in fodder and feed prices further increases uncertainty in managing farm expenses. These findings coincide with similar observations reported across different states of India (Lalrinsangpuii *et al.*, 2016; Smitha *et al.*, 2019; Lohith *et al.*, 2021; Singh *et al.*, 2021) [13, 14, 15, 11].

With regard to breeding constraints, the basic charge for artificial insemination is generally around ₹500 through both public and private service providers, however, the high fees charged by veterinary professionals can be attributed to the long distances which they travelled to reach the villages for treatment, making the service burdensome for farmers who are staying far away. Furthermore, lack of accessible extension guidance adversely restricts the adoption of improved breeding practices. This may be because of poor economic conditions and low educational level of the farmers. These results are in agreement to the findings of Singh *et al.* (2012) [16], who reported that general cost of treating breeding-related problems, distant locations of veterinary hospitals and limited artificial insemination centres remain as the primary concern for farmers in Manipur state of India. Comparable findings have also been reported by Gautam and Jha (2022) [17].

Within the healthcare constraints faced by the dairy cattle farmers, it is revealed that the state government veterinary services lack the means for on-site disease diagnosis and emergency healthcare services unless personally called for the treatment of animals. Even when called, government veterinary officers often take hours or several days to reach the farm which may be attributed to the limited number of veterinary hospitals and doctors in the study area. Meanwhile, private practitioners respond promptly due to the financial incentives involved, forcing farmers to rely on private veterinary services at their own expense. The findings are in congruity with the observations of Nagrale *et al.* (2015) [18] and Saurav *et al.* (2024) [19].

Among the farm management constraints, the lack of extension services and follow-up support, coupled with limited government technical support, emerges as the most serious constraint. This gap leaves farmers without the necessary information and awareness to adopt modern dairy practices. The results are further supported by the observations of Malik *et al.* (2017) [20], who reported that poor extension services severely restrict farmers particularly those lacking access to institutional guidance and government schemes. This may be attributed to the irregularities and inefficiency of the government support for dairy farming in the state.

For milk marketing constraints, the absence of organised milk collection centres in the study area forces the farmers to sell their highly perishable produce in the unpredictable local markets, thereby exposing them to exploitation by middlemen and unfair pricing. Such infrastructural deficits align closely with the findings of (Nisha *et al.*, 2022) [21], who emphasized that the absence of formal price-fixing agencies and subsequent exploitation by middlemen act as critical hurdles that threaten farm sustainability. Bhawar *et al.* (2020) [22] and Narayan *et al.* (2014) [23] similarly reported that the scarcity of active cooperative societies and the inconsistent pricing offered by local vendors constitute major marketing barriers for the farmers.

Additionally, the findings revealed seasonal variation in milk price and demand in the study area. This fluctuation is due to the population's consumption of value-added dairy products like lassi and curd, predominantly during the summer months. Therefore, this seasonal demand pattern deprives farmers of a stable, year-round income. Moreover, Boogaard *et al.* (2011) [24] highlighted that the sustainability of dairy farming is closely influenced by the perceptions and preferences of the people associated with it.

Traditionally, milk consumption in Nagaland has been relatively low which may be associated with the prevailing dietary preference for meat over milk and milk products, along with the general notion that Nagas are meat eater and not a milk drinker. Thus, in view of the overall findings, there is a need to put emphasis on dairy farming in Nagaland (Singh *et al.*, 2021) [7].

Conclusion

The findings from this study indicated that dairy farmers in the study area faced different constraints, such as costly concentrate feed and fodder, high artificial insemination costs, less developed veterinary infrastructure and absence of organised market for milk sale. In order to improve the condition, dairy development efforts need to be strengthened and prioritise on improving better accessibility of artificial insemination, veterinary infrastructure, healthcare services, improved management practices and to market their produce more effectively. Farmers should be empowered through easy access to government schemes, technical guidance and subsidized services. Further, priority should be given to the development of local milk collection centres to provide a stable market, eliminate middleman dependency and empower cooperatives to offer more competitive prices to farmers. The availability and affordability of quality feeds and additives should also be improved in the study area to support sustainable dairy production.

Declaration

Competing interests: The authors declare no competing interests.

Ethical consideration and consent to participate: Informed consent of the participants.

Conflicts of interest: The authors declare no conflicts of interest.

Publisher's note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organisations, or those of the publisher, the editors and the reviewers. Any product/process or technology that may be evaluated in this article or a claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.

Acknowledgments

Authors are thankful to the Director, ICAR-NDRI, Karnal, Haryana for extending the financial support to carry out this work. We also extend our sincere thanks to Head, ICAR-NDRI, Eastern Regional Station, Siliguri, West Bengal for his support and help to prepare the manuscript.

References

1. Press Information Bureau. India's dairy sector: Anchoring nutrition and income security. Ministry of Information and Broadcasting, Government of India. 2025.
2. Department of Animal Husbandry and Dairying. Basic Animal Husbandry Statistics. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India; 2025.
3. Kale RB, Ponnusamy K, Chakravarty AK, Sendhil R, Mohammad A. Assessing resource and infrastructure disparities to strengthen Indian dairy sector. *Indian Journal of Animal Sciences*. 2016;86(6):720–725.
4. Koireng R, Anal PR, Jana K, Devi PKH. Prospects of sustainable livestock farming in NEH region of India. *International Journal of Current Microbiology and Applied Sciences*. 2018;7(1):1285–1292.
5. Mili B, Dutta H. Current scenario of milk production in the North-eastern states of India: Constraints and mitigation strategies to address milk shortfall. *Indian Journal of Animal Sciences*. 2024;94(10):896–900.
6. Chaudhary JK, Singh NS, Tolenkomba TC, Behera SK, Singh M. Livestock sector in North-Eastern Region of India: An appraisal of livestock production and population. *International Journal of Veterinary Sciences and Animal Husbandry*. 2025;10(Special Issue 8):149–153.
7. Singh M, Pongener N, Mollier RT, Rajkhowa DJ. Dairy farming in Nagaland: An emerging enterprise. *Indian Farming*. 2021;71(2):23–24.
8. Venkatasubramanian V, Kumaresan A, Pourouchottamane R, Mishra A, Pankaj PK. Capacity building of milk producers for sustainable growth of dairying in Northeastern region: Status and strategies. *Veterinary Practitioner*. 2012;13(1):121–125.
9. Gamit V, Odedra M, Ahlawat A, Prajapati V, Patel H, Gamit K. Constraints faced by dairy farmers in different states of India: an overview. *Journal of Entomology and Zoology Studies*. 2021;9(1):1901–1906.
10. Ashokbabu C, Saratchandra A, Harikrishna C. Constraints perceived in dairy husbandry practices by livestock farmers in Northern Telangana State. *Indian Journal of Dryland Agricultural Research & Development*. 2022;37(1):20–22.
11. Singh R, Chiphang S, Singh A. Constraint analysis of dairy sector in North Eastern Region: A producers and consumers perspective. *Indian Journal of Dairy Science*. 2021;74(3):277–279.
12. Priya S, Rahaman SM, Wadhwani MK, Anjum N, Sinha A, Homa F *et al.* Dairy dreams deferred: What's holding back Bihar's dairy farmers? *Journal of Scientific Research and Reports*. 2025;31(6):952–965.
13. Lalrinsangpuii, Malhotra R, Priscilla L. Economics of milk production and its constraints in Mizoram. *Indian Journal of Dairy Science*. 2016;69(5):588–594.
14. Smitha S, Devi MCA, Letha Devi G, Subash S. Analysis of constraints in dairy farming in Kerala-multi stakeholder perspective. *Indian Journal of Dairy Science*. 2019;72(3):342–346.
15. Lohith J, Rajeshwari YB, Patil VM, Gouri MD, Prasanna SB. Study on constraints faced by Malnad *Gidda* cattle farmers in Shivamogga district of *Karnataka*. *Ruminant Science*. 2021;10(1):127–132.
16. Singh AS, Singh K, Chakravarty R, Vairagar VG, Kumar C. Constraints perceived by members of Manipur (India) Milk Producers Cooperative Union in practicing improved dairy farming. *Journal of Dairying, Foods & Home Sciences*. 2012;31(4):279–283.
17. Gautam PK, Jha SK. Constraints faced by dairy households in Bundelkhand India: A Garrett ranking approach. *Plant Archives*. 2022;22(2):393–396.
18. Nagrale BG, Datta KK, Chauhan AK. An analysis of constraints faced by dairy farmers in Vidarbha region of Maharashtra. *Indian Journal of Dairy Science*. 2015;68(4):390–394.
19. Saurav SK, Chandran V, Chakravarty R, Ponnusamy K, Meena BS, Malhotra R *et al.* Perceived constraints and benefits of dairy farming practices in Northern Bihar: A Garrett ranking analysis. *Journal of Community Mobilization and Sustainable Development*. 2024;19(2):287–293.
20. Malik MH, Verma HK, Sharma RK. Constraints about dairy farming in central zone of Punjab by Garrett's ranking technique. *International Journal of Livestock Research*. 2017;7(11):215–219.
21. Nisha PR, Devaki K. Reasons for closure of livestock farms in North Eastern Zone of Tamil Nadu. *Journal of Krishi Vigyan*. 2022;11(Special Issue):89–92.

22. Bhawar RS, Dixit PK, Sivaram M. Constraints faced by the dairy farmers in production and marketing of milk in northern dry zone of *Karnataka*. *Indian Journal of Dairy Science*. 2020;73(3):274–279.
23. Narayan L, Meena GL, Upadhyay B. Constraints analysis of dairy farming in Banswara district. *Indian Journal of Extension Education & Rural Development*. 2014;22:81–84.
24. Boogaard BK, Oosting SJ, Bock BB, Wiskerke JSC. The socio-cultural sustainability of livestock farming: An inquiry into social perceptions of dairy farming. *Animal*. 2011;5(9):1458–1466.

How to cite this article: Murry J, Xess N, Sahoo SK, Kumar V, Zomuanpuui N, Kumar A, et al. Analyzing multidimensional constraints in dairy production systems of Nagaland using Garrett's ranking technique. *International Journal of Agriculture Extension and Social Development*. 2026;9(9):892-896. doi: <http://www.doi.org/10.33545/26180723.2026.v9.i9l.4291>

Authors

Janrhomo Murry

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Neelkusum Xess

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Santosh Kumar Sahoo

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Vikash Kumar

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Nancy Zomuanpuui

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Amanish Kumar

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Nalukurthy Nikhil

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Sylvia Lalhmingmawii

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India

Asif Mohammad

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal, 741235, India