

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 6; June 2026; Page No. 187-190

Received: 12-03-2026
Accepted: 17-04-2026

Indexed Journal
Peer Reviewed Journal

Constraint analysis in adopting mastitis prevention and management technologies in Kanpur Dehat district of Uttar Pradesh

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DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i6c.3680>

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Abstract

Mastitis is considered to be one of the most expensive diseases affecting the profitability of milch animals through production losses. Various mastitis preventive and management techniques, such as teat dips and mastitis diagnostic kits, are recommended to prevent intramammary infections and to diagnose them at the subclinical stage. Despite these innovations, very low adoption has been observed at the field level, leading to a higher prevalence of clinical mastitis. The study was carried out in Kanpur Dehat district of Uttar Pradesh. A total of four blocks and five villages from each block (20 villages) were selected, and 10 respondents from each village were selected. Thus, a total of 200 respondents were selected for the present study. A structured and pretested interview schedule was used to collect data from dairy farmers in the study area. The findings revealed that lack of awareness about the technology (GMS-68.30), Lack of technical knowledge on mastitis (GMS-73.58), Inability to make decisions (GMS-62.70), and high cost of private veterinary services (GMS-85.33) were the major constraints hindering the adoption of mastitis management technologies in the study area.

Keywords: Mastitis, management, technologies, Garret's ranking; constraint analysis, dairy

Introduction

Dairy farming plays a significant role in livelihood security and supplements the income of millions of rural households in India (Verma *et al.* 2020 and Verma *et al.* 2021) ^[10, 9]. Mastitis, one of the most expensive diseases, reduces the profitability of dairy animals through production losses and economic returns (Bardhan, 2013) ^[1] to dairy farmers in India. In dairy animals, there are three types of contagious mastitis, viz. Clinical mastitis, subclinical mastitis and chronic mastitis and among these three, sub-clinical mastitis is the major and silent problem causing the highest losses in the form of income to dairy farmers (Tripti *et al.*, 2018). Early diagnosis, management or cure of mastitis at the subclinical stage saves a substantial amount of dairy farmers' income and leads to an increase in production, improvement in milk quality, milk quantity and consumer health safety (Wattiaux, 2011) ^[11]. The losses due to mastitis are recognised across the world as a major problem in dairy animals and limit milk production efficiency in many dairy herds despite the amount of knowledge available on the subject (Hogeveen, 2005) ^[6]. The occurrence of mastitis is a complicated problem associated with almost every conceivable factor of management and the environment

(Blood and Radostitis, 1989) ^[2]. A farmer who knows that mastitis causes production inefficiencies and additional costs can be motivated to act on mastitis prevention (Valeeva *et al.*, 2007) ^[3]. Disease control and prevention decisions are often based on the farmer's perception and knowledge level of mastitis control measures. Perception refers to what a farmer thinks is correct. For effective mastitis control, farmers' perceptions of disease risk, different control measures to practice, constraints and the inherent benefits associated with available disease control options are important criteria in adoption decisions (Gnanasekar and Christy, 2013) ^[4]. Therefore, this study was conducted to assess the constraints faced by dairy farmers in adopting mastitis prevention and management technologies in Kanpur Dehat district of Uttar Pradesh.

Materials and Methods

The study was conducted in Kanpur Dehat district of Uttar Pradesh in 2024-25. A total of four blocks, and from each block, five villages (20 villages) were selected. From each village, 10 respondents who were engaged in dairy farming were selected as respondents. A total of 200 dairy farmers were randomly selected for the present study. A well-

structured and pre-tested interview schedule was used to collect the data from the respondents. The dairy farmers were asked to rank the various constraints which restrict the adoption of mastitis prevention and management technologies on a scale of 1 to 5, where 1 is the most important and 5 is the least important, which were used for prioritisation of constraints. The responses were recorded for four types of constraints, viz. general, technical, socio-psychological and economic constraints. The data were compiled and analysed with Microsoft Excel. The analysis of constraints was done by using Garrett's ranking techniques. In Garrett's ranking techniques, the orders of merit as given by the respondents were converted into ranks by using the following formula

Where,

R_{ij} = Rank given for i^{th} problem by j^{th} individual.

N_j = Number of problems ranked by the j^{th} individual

The percentage position of each rank was then converted into scores by referring to the table (Garrett and Woodworth, 1969) [5]. The scores of individual dairy farmers for a particular problem were added and divided by the total number of respondents. The mean scores for all the constraints were arranged in descending order, and thus, ranks were assigned to prioritise the constraints.

Table 1: Distribution of respondents based on General constraints faced in the adoption of mastitis-preventing technologies

Sl. No.	Constraints	Teat Dip		Mastitis Diagnosis Kit	
		Garret's Mean score	Rank	Garret's Mean score	Rank
1.	Lack of awareness about the technology	68.30	I	67.20	I
2.	Inadequate knowledge of diseases and their control measures	65.30	II	63.40	II
3.	Inadequate knowledge about technology use	56.62	III	58.35	III
4.	Inadequate government support	30.33	VI	49.55	IV
5.	Poor accessibility to technology inputs	51.40	IV	44.15	V
6.	Lack of timely services	44.67	V	29.80	VI

Technical constraints

The findings presented in the table 2 showed the technical constraints faced by dairy farmers in the adoption of teat dipping and the mastitis diagnosis kit. Lack of technical knowledge about the technologies is the major constraint faced by the dairy farmers. Technical knowledge on mastitis emerged as the most important constraint for both, with Garrett's mean score of 73.58 for the mastitis diagnosis kit and 69.70 for teat dip and ranked 1st. This indicate that dairy farmers have insufficient understanding of mastitis, its causes, prevention and control measures, which significantly restrict the adoption of technology in the study area. Lack of knowledge about the clean milk production practices for the management of mastitis was ranked 2nd with a Garrett mean score of 71.50 and 68.60 for mastitis diagnosis kit and teat dip, respectively. This shows that hygienic milking practices and milk quality management were critical in the study area. Lack of technical skill was ranked 3rd with Garrett mean score of 64.80 and 62.33 in the

Results and Discussion

Constraints faced by farmers in the adoption of mastitis prevention and management technologies

The various factors restricting the adoption of two mastitis-preventing technologies, viz., teat dip and mastitis diagnosis kit, were studied as four types of constraints, viz., general, technical, socio-psychological and economic. The results are discussed below;

General constraints

The findings related to general constraint analysis by Garret's Ranking Technique for the adoption of mastitis prevention and management technologies are presented in Table 1. It revealed that among six constraints in the adoption of teat dip and mastitis diagnosis kit, lack of awareness about the technology was the first constraint with garret mean score of 68.30 in case of teat dip and 67.20 in case of Mastitis Diagnosis Kit and ranked 1st followed by Inadequate knowledge of diseases and their control measures with garret mean score of 65.30 in case of teat dip and 63.40 in case of Mastitis Diagnosis Kit and ranked 2nd. The poor and inadequate knowledge about the technology use is the 3rd major constraint, with a mean score of 58.35 and 56.62 in the case of the Mastitis Diagnosis Kit and Teat dip, respectively. Inadequate government support, Poor accessibility to technology inputs and lack of timely services were ranked 4th, 5th and 6th.

case of teat dip and mastitis diagnosis kit, respectively. Inadequate training facilities was ranked 4th with a Garrett mean score of 54.80 and 53.36 for mastitis diagnosis kit and teat dip, respectively. Improper communication and poor extension contacts ranked 5th with Garrett mean scores of 49.27 and 48.39 for mastitis diagnosis kit and teat dip, respectively, indicating the weak interaction between dairy farmers and extension service providers and veterinary officials, which in turn hinders the dissemination of scientific know-how in the study area. Lack of trained, field-oriented veterinary personnel ranked 6th with a Garrett mean score of 42.81 and 39.63 in the case of teat dip and for mastitis diagnosis kit, respectively. Availability of trained veterinary professionals is one of the serious concerns in the local area. Recurring mastitis in the same or other animals in the same herd and Lack of satisfactory/expected results were ranked 7th and 8th technical constraints which are faced by respondents in the adoption of mastitis management technologies in the study area.

Table 2: Distribution based on Technical constraints faced by respondents in the adoption of mastitis management technologies

Sl. No.	Constraints	Teat Dip		Mastitis Diagnosis Kit	
		Garret's Mean score	Rank	Garret's Mean score	Rank
1.	Lack of technical knowledge on mastitis	69.70	I	73.58	I
2.	Lack of knowledge about the clean milk production practices for the management of mastitis	68.60	II	71.50	II
3.	Lack of technical skill	64.80	III	62.33	III
4.	Lack of trained, field-oriented and veterinary personnel	42.81	VI	39.63	VI
5.	Inadequate training facilities	53.36	IV	54.80	IV
6.	Improper communication and poor extension contacts	48.39	V	49.27	V
7.	Lack of satisfactory/expected results	24.28	VIII	24.56	VII
8.	Recurring mastitis in the same or other animals in the same herd	28.33	VII	22.50	VIII

Socio-psychological constraints

The results of socio-psychological constraints faced by dairy farmers in adoption of teat dipping and mastitis diagnosis kit technologies among dairy farmers were presented in table 3. The findings revealed that the inability to take decisions to implement the teat dip technology was ranked 1st with a Garrett mean score of 62.70, while high cost of treatment was ranked 1st in case of adoption of Mastitis Diagnosis Kit

in the study area. Other constraints such as shortage of time for animal management in case of Mastitis Diagnosis Kit (ranked 3rd with GMS of 59.23), shortage of manpower (ranked 4th with GMS of 56.20), and poor socio-economic condition were ranked 5th as most serious constraints with GMS of 46.30. The study conforms to the Nimbalkar *et al.* (2022) ^[7].

Table 3: Distribution based on Socio-psychological constraints faced by respondents in adoption of mastitis management technologies

Sl. No.	Constraints	Teat Dip		Mastitis Diagnosis Kit	
		Garret's Mean score	Rank	Garret's Mean score	Rank
1.	Poor socio-economic condition	46.30	V	45.79	V
2.	Shortage of manpower	56.20	IV	67.90	II
3.	Shortage of time for animal management	60.00	II	59.23	III
4.	Inability to make decisions	62.70	I	52.83	IV
5.	Lack of interest in dairy farming	25.30	VI	25.25	VI
6.	High cost of treatment	59.30	III	72.50	I

Economic constraints

The findings presented in Table 4 showed the economic constraints faced by dairy farmers in the adoption of teat dipping and the mastitis diagnosis kit to prevent mastitis in dairy animals. The results revealed that high cost of private veterinary services emerged as the most severe financial constraint with Garrett's mean score of 69.33 and 85.33 in case of teat dipping and the mastitis diagnosis kit, respectively, and ranked 1st. Due to the high cost of services, dairy farmers find it difficult to purchase and use the preventive technologies such as teat dipping. Seasonal agricultural income was ranked second with the highest score among all constraints for teat dipping (77.35). This indicates that fluctuations in income significantly affect dairy farmers' ability to invest in preventive animal health

care measures. Low agricultural income forced the dairy farmers to postpone or neglect investment in mastitis prevention technologies. High cost of treatment of mastitis ranked third (65.88), implying that farmers perceive mastitis-related treatment expenses as a substantial financial burden. Lack of finance ranked 3rd with GMS of 61.22, followed by distance of veterinary hospitals, which was ranked 5th with GMS of 59.33. Low opportunities for training in nearby veterinary universities ranked 6th with GMS of 48.66, and poor housing for milch animals ranked 7th with GMS of 43.55. These constraints are perceived as less of an economic hindrance as compared to service and treatment costs. The findings of the study are in line with the study of Panchbhai *et al.* (2017) ^[8].

Table 4: Distribution based on Economic constraints faced by respondents in the adoption of mastitis management technologies

Sl. No.	Type of constraints	Teat Dip		Mastitis Diagnosis Kit	
		Garret's Mean score	Rank	Garret's Mean score	Rank
1.	High cost of treatment	65.88	III	81.33	II
2.	High Cost of Private Veterinary Services	69.33	I	85.33	I
3.	Distant location of veterinary hospitals incurs huge expenditure	59.33	V	67.73	IV
4.	Seasonal Agriculture Income	77.35	II	66.20	V
5.	Low opportunity for training in the nearest veterinary university	48.66	VI	57.40	VI
6.	Lack of finance	61.22	IV	72.55	III
7.	Poor housing for milch animals	43.55	VII	45.66	VII

Conclusion

The constraint analysis by Garret Ranking Techniques revealed that lack of awareness about the technology,

Inadequate knowledge of diseases and their control measures, lack of technical knowledge on mastitis, inability to make decisions and high cost of private veterinary

services are the major constraints hindering adoption of mastitis management technologies in the study area. Based on the findings, the study stressed the need for extensive extension efforts to make aware the dairy farmers aware of their major problems with dairy animals, which can be minimised with the adoption of simple technologies. Educating the farming community through different means can play a significant role in reducing the incidence of mastitis and ultimately increasing the farm income.

Acknowledgement

The authors are thankful to respondents who voluntarily participated in the survey and helped in the completion of this study. Authors also acknowledge the Vice-Chancellor, CSAUAT, Kanpur, Uttar Pradesh, for providing necessary facilities.

Conflict of Interest

None

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