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Perceived constraints in the adoption of recommended dairy farming practices: Evidence from western Uttar Pradesh

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ABSTRACT

Dairy farming is a major source of livelihood, nutritional security and rural employment in western Uttar Pradesh, yet the adoption of recommended dairy farming practices remains limited by technical, infrastructural, institutional and knowledge-related factors. This study identified and prioritised the constraints perceived by dairy farmers in adopting recommended practices. A descriptive survey was conducted in Meerut and Saharanpur districts, where a multistage sampling procedure yielded 200 dairy farmers, each owning at least one lactating animal. Primary data were collected through a structured interview schedule, and sixteen constraints were prioritised by Garrett's ranking technique; the validity of each constraint was further examined with a scientific relevance score. Lack of training facilities was the most severe constraint (mean Garrett score 73.70), followed by inadequate knowledge about pedigree enquiry (69.65), unavailability of appropriate utensils for quality milk production (63.30), non-availability of timely treatment facilities (60.95) and poor record management (57.15). All sixteen constraints obtained relevance scores above 0.50 (range 0.65–0.85), and the relevance scores were strongly correlated with the Garrett scores (Spearman's $\rho = 0.89$, $p < 0.001$). The findings call for practical, location-specific training, better veterinary service delivery, hygienic milk-handling support and systematic farm record keeping to narrow the technology gap in dairy farming.

Keywords: Adoption, Constraints, Dairy farming, Extension, Garrett's ranking technique, Western Uttar Pradesh

1. Introduction

Livestock, and dairy animals in particular, are central to India's agrarian economy: they contribute to household income, employment, nutritional security and rural development. For small and marginal farmers, dairying provides a regular cash flow and acts as a buffer against crop failure and seasonal fluctuations in farm income (DAHD, 2024; Meena *et al.*, 2022) [1, 2]. Milk and other livestock products also allow rural households to diversify their income and strengthen their livelihood security (Meena *et al.*, 2022) [2].

Dairy farming is widely practised in Uttar Pradesh and forms an important part of the state's rural economy. However, the productivity and profitability of dairy enterprises are often held back by inadequate adoption of scientific husbandry practices. Recommended practices relating to breeding, balanced feeding, clean drinking water, disease prevention and vaccination, hygienic milk production, record keeping and scientific housing are essential for improving productivity, reproductive efficiency, animal health and farm returns. Adoption of such improved technologies has been associated with higher milk production and better economic returns (Murai *et al.*, 2011; Kumar *et al.*, 2019) [4, 3].

Despite these benefits, farmers face a range of constraints that restrict adoption. In western Uttar Pradesh, Kumar *et al.* (2019) [3] reported long calving intervals associated with repeat breeding, high costs of veterinary medicines and feed, non-remunerative milk prices and high costs of constructing suitable housing as major constraints, and recommended awareness programmes and need-based training. Murai *et al.* (2011) [4] similarly documented differential adoption of scientific dairy farming practices and the constraints associated with it. More recent evidence from the state shows that lack of technical knowledge and poor awareness of modern practices continue to limit dairy enterprises, with farmers seeking better infrastructure and access to technical experts (Meena *et al.*, 2022) [2]. In Ayodhya district, lack of knowledge about balanced rations and vaccination were among the leading constraints (Kumar *et al.*, 2024) [5].

Knowledge and extension support have become even more important with the spread of digital livestock advisory services. In Mathura district, outdated technology, difficulty in operating mobile applications, their complexity, low awareness and lack of encouragement constrained farmers' use of livestock-based mobile applications (Rawat *et al.*, 2025) [6]. In Bareilly district, knowledge gaps, limited access to quality inputs and infrastructural shortfalls restricted the adoption of improved feeding practices (Yadav *et al.*, 2026) [7].

Although several studies have examined constraints in dairy farming, their nature, magnitude and relative severity vary with agro-climatic conditions, farming systems, resource endowment, institutional support, markets and the socio-economic profile of farmers. A systematic, location-specific assessment of farmers' perceptions is therefore needed to identify priority areas for intervention and to design targeted extension strategies. Against this background, the present study was undertaken to identify, prioritise and validate the constraints perceived by dairy farmers in adopting recommended dairy farming practices in western Uttar Pradesh.

2. Research methodology

2.1 Study area and sampling

A descriptive research design with a survey approach was adopted. The study was conducted in Meerut and Saharanpur districts of western Uttar Pradesh using a multistage sampling procedure (Figure 1). In the first stage, two blocks were selected at random from each district. In the second stage, two villages were selected at random from each block. In the final stage, 25 dairy farmers were purposively selected from each village, giving a total sample of 200 respondents. Only farmers who owned at least one lactating dairy animal at the time of data collection were included, so that every respondent had recent, first-hand experience of dairy management.

2.2 Identification of constraints and data collection

Constraints were identified through a review of literature, discussions with dairy farmers and consultation with extension personnel and subject-matter specialists. Sixteen constraints were finalised and included in a structured interview schedule. Each respondent was asked to rank the constraints according to the severity with which they were experi-

enced, assigning rank 1 to the most severe constraint, rank 2 to the next, and so on (Garrett *et al.*, 1969; Dhanavandan, 2016) [9, 8].

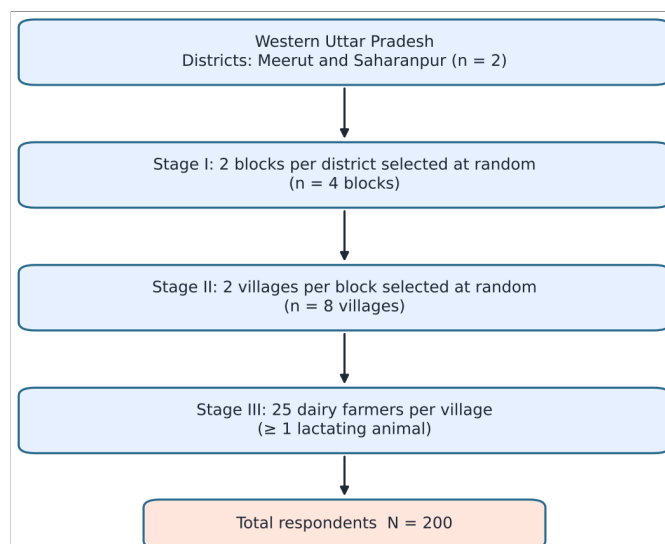


Figure 1. Multistage sampling design used to select the respondents

2.3 Garrett's ranking technique

Garrett's ranking technique was used because it converts qualitative rank-order data into quantitative scores, which allows constraints to be compared statistically and prioritised on the basis of the collective perception of respondents (Garrett *et al.*, 1969; Dhanavandan, 2016; Radhika *et al.*, 2023) [9, 8, 10]. For each respondent, the rank assigned to a constraint was converted into a per cent position as follows:

$$\text{Per cent position} = 100(R_{ij} - 0.5)/N_j$$

where R_{ij} is the rank assigned to the i th constraint by the j th respondent and N_j is the number of constraints ranked by the j th respondent. Each per cent position was converted into a Garrett score using the conversion table of Garrett *et al.* (1969) [9]. The scores given by all respondents to a constraint were summed to obtain its total Garrett score, and the mean Garrett score was calculated as:

$$\text{Mean Garrett score} = \Sigma G_{ij}/n_i$$

where ΣG_{ij} is the total Garrett score of the i th constraint and n_i is the number of respondents who ranked it. Constraints were then ranked in descending order of their mean Garrett scores; the constraint with the highest score was considered the most severe.

2.4 Validation of constraints

To test whether the reasons given by farmers had a sound scientific basis, a scientific relevance score was computed for each constraint. [Authors to confirm: the constraints were rated by a panel of __ sub-

ject-matter experts on a __-point continuum, and the score was calculated as the total score obtained divided by the maximum obtainable score.] A score above 0.50 was taken to indicate that the constraint was a valid and scientifically relevant reason for slow adoption. Agreement between farmers' perceived severity (mean Garrett score) and expert-judged relevance was examined with Spearman's rank correlation coefficient.

3. Results and discussion

3.1 Constraints in the adoption of recommended dairy farming practices

The constraints perceived by dairy farmers, with their Garrett scores and ranks, are presented in Table 1 and Figure 2. Constraints related to knowledge, training, infrastructure and institutional support clearly shaped the extent of adoption of improved practices.

Table 1. Constraints in the adoption of recommended dairy farming practices (N = 200)

S. No.	Constraint	Total score	Mean Garrett score	Rank
1	Lack of training facilities for dairy farmers	14740	73.70	I
2	Inadequate knowledge about pedigree enquiry	13930	69.65	II
3	Lack of knowledge about recommended feeding practices (e.g. silage making)	10690	53.45	VIII
4	Inadequate knowledge about providing clean drinking water to animals	10710	53.55	VII
5	Lack of knowledge about balanced diet and mineral mixture	6520	32.60	XV
6	Poor record management by farmers	11430	57.15	V
7	Lack of knowledge of common contagious diseases and their prevention and control	10880	54.40	VI

(continued on next page)

S. No.	Constraint	Total score	Mean Garrett score	Rank
8	Non-availability of timely treatment facilities	12190	60.95	IV
9	Unawareness about milk-borne zoonotic diseases	9630	48.15	XI
10	Non-availability of vaccines and medicines in veterinary hospitals	6920	34.60	XIV
11	Lack of resources for providing scientific housing	8850	44.25	XII
12	Lack of knowledge about vaccination schedule	6020	30.10	XVI
13	Unavailability of appropriate utensils for quality milk production	12660	63.30	III
14	Lack of scientific housing and milking facilities	10000	50.00	X
15	Lack of awareness about safe handling of animals to minimise injury, pain and distress	7340	36.70	XIII
16	Inability to identify animals' needs and take appropriate action	10520	52.60	IX

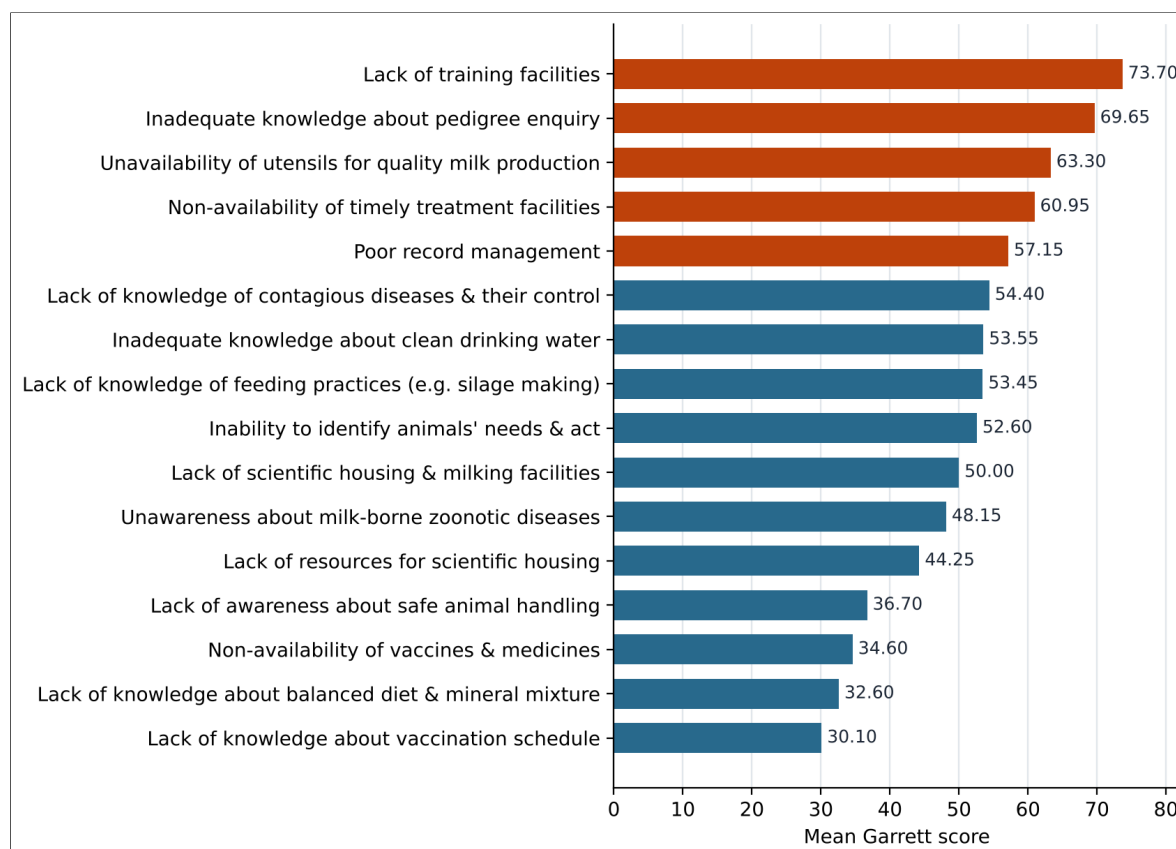


Figure 2. Mean Garrett scores of the constraints perceived by dairy farmers (the five most severe constraints are highlighted)

Lack of training facilities was the most severe constraint, with the highest mean Garrett score of 73.70. This points to a strong demand for organised, practical and location-specific training in scientific dairy farming. Hands-on training in breeding, feeding, health care, milking hygiene and herd management could improve farmers' knowledge and skills and thereby narrow the technology gap in dairy production.

Inadequate knowledge about pedigree enquiry ranked second (69.65). Many farmers were unaware of the need to verify the pedigree and genetic merit of sires and dams before artificial insemination and relied on *para*-veterinarians or semen suppliers without assessing semen quality. This can depress milk productivity and slow the long-term genetic improvement of the herd.

Unavailability of appropriate utensils for quality milk production ranked third (63.30). Many farmers lacked access to, or could not afford, hygienic milk containers, strainers, milk-testing kits and other essential equipment. Unhygienic or unsuitable equipment raises the risk of contamination and bacterial load, shortens shelf life and reduces the marketability of milk.

Non-availability of timely treatment facilities ranked fourth (60.95). Delays in obtaining veterinary services, especially during outbreaks or emergencies, prolong animal suffering and increase mortality, production losses and treatment costs, and may discourage farmers from adopting recommended animal-health practices.

Poor record management ranked fifth (57.15). Most farmers did not keep systematic records of breeding, calving, milk yield, feed use, health events, expenditure and income. Without such records, farmers cannot monitor performance, detect problems early, plan or assess profitability, which limits scientific decision-making at the farm level. Lack of knowledge of common contagious diseases and their prevention and control ranked sixth (54.40). Many respondents were not fully aware of the transmission pathways, clinical signs, vaccination schedules and biosecurity measures for economically important diseases such as foot-and-mouth disease, haemorrhagic septicaemia and black quarter. Inadequate knowledge about providing clean drinking water ranked seventh (53.55); continuous access to safe water is essential for animal health, feed intake and milk yield. Lack of knowledge about recommended feeding practices, particularly silage making, ranked eighth (53.45). Although farmers routinely fed green fodder and concentrates, many were unfamiliar with fodder conservation, which limits the supply of quality fodder during lean seasons.

Other notable constraints were farmers' inability to identify animals' needs and act on them (52.60), lack of scientific housing and milking facilities (50.00), unawareness about milk-borne zoonotic diseases (48.15) and lack of resources for scientific housing (44.25). These reflect gaps in animal-welfare awareness, public-health knowledge and farm infrastructure. The comparatively low scores for safe animal

handling, availability of vaccines and medicines, balanced diet and mineral mixture, and vaccination schedule suggest that farmers regarded training, technical knowledge, veterinary services and record keeping as more pressing concerns.

These findings agree with earlier studies that identified inadequate artificial insemination facilities, lack of technical knowledge and institutional constraints as major limitations in dairy farming (Roy *et al.*, 2007; Murai *et al.*, 2011; Meena *et al.*, 2022) [11, 4, 2]. Kumar *et al.* (2012) [12] likewise reported that constraints were most pronounced in breeding practices and comparatively less severe in management practices.

3.2 Validation of constraints

The scientific relevance scores of the reasons for slow adoption are presented in Table 2 and Figure 3. All sixteen constraints scored above 0.50 (range 0.65–0.85), confirming that the reasons cited by farmers were valid and scientifically relevant.

Table 2. Scientific relevance scores of the reasons for slow adoption of recommended dairy farming practices

S. No.	Reason for slow adoption	Scientific relevance score
1	Lack of training facilities for dairy farmers	0.85
2	Inadequate knowledge about pedigree enquiry	0.83
3	Lack of knowledge about recommended feeding practices (e.g. silage making)	0.76
4	Inadequate knowledge about providing clean drinking water to animals	0.77

S. No.	Reason for slow adoption	Scientific relevance score
5	Lack of knowledge about balanced diet and mineral mixture	0.68
6	Poor record management by farmers	0.79
7	Lack of knowledge of common contagious diseases and their prevention and control	0.78
8	Non-availability of timely treatment facilities	0.81
9	Unawareness about milk-borne zoonotic diseases	0.73
10	Non-availability of vaccines and medicines in veterinary hospitals	0.70
11	Lack of resources for providing scientific housing	0.72
12	Lack of knowledge about vaccination schedule	0.74
13	Unavailability of appropriate utensils for quality milk production	0.82
14	Lack of scientific housing and milking facilities	0.65
15	Lack of awareness about safe handling of animals to minimise injury, pain and distress	0.71
16	Inability to identify animals' needs and take appropriate action	0.75

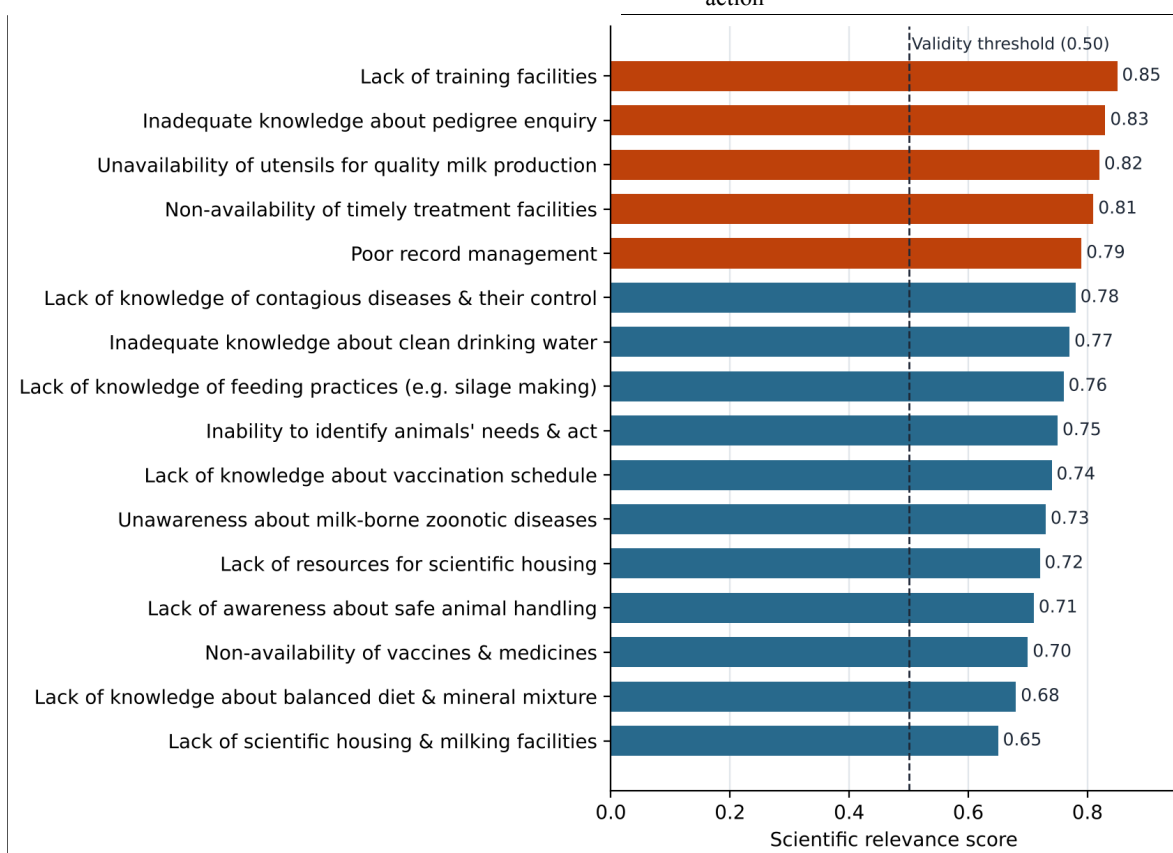


Figure 3. Scientific relevance scores of the reported constraints; the dashed line marks the 0.50 validity threshold

Lack of training facilities recorded the highest relevance score (0.85), followed by inadequate knowledge about pedigree enquiry (0.83) and unavailability of appropriate utensils for quality milk production (0.82). Inadequate practical training, limited knowledge of the genetic merit of animals and poor access to hygienic milk-handling equip-

ment were therefore the most valid reasons for slow adoption. Non-availability of timely treatment facilities (0.81) and poor record management (0.79) were also highly valid: delayed veterinary care postpones diagnosis and treatment, harming animal health, productivity and income, while the absence of records on breeding, calving, milk

production, feeding, health and finances weakens farm-level decision-making.

Lack of knowledge of contagious diseases and their control (0.78), inadequate knowledge about clean drinking water (0.77) and lack of knowledge about feeding practices such as silage making (0.76) were also validated, indicating a need for technical guidance on disease prevention, biosecurity, vaccination, water management and fodder conservation. Inability to identify animals' needs (0.75), lack of knowledge about the vaccination schedule (0.74), unawareness about milk-borne zoonoses (0.73), lack of resources for scientific housing (0.72) and lack of awareness about safe animal handling (0.71) showed reasonable relevance, pointing to gaps in animal welfare, public health and preventive care. Non-availability of vaccines and

medicines (0.70), lack of knowledge about balanced diet (0.68) and lack of scientific housing and milking facilities (0.65) had the lowest scores, but all remained above the 0.50 threshold.

Farmers' perceived severity and the experts' judgement of relevance were closely aligned (Figure 4). The mean Garrett scores and the relevance scores were strongly and positively correlated (Spearman's $\rho = 0.89$, $p < 0.001$, $n = 16$), so the constraints that farmers felt most acutely were also those with the strongest scientific basis. Two constraints departed from this pattern: lack of knowledge about the vaccination schedule (S. No. 12) received the lowest severity score but a moderately high relevance score, suggesting that farmers may underestimate its importance; lack of scientific housing and milking facilities (S. No. 14) showed the reverse.

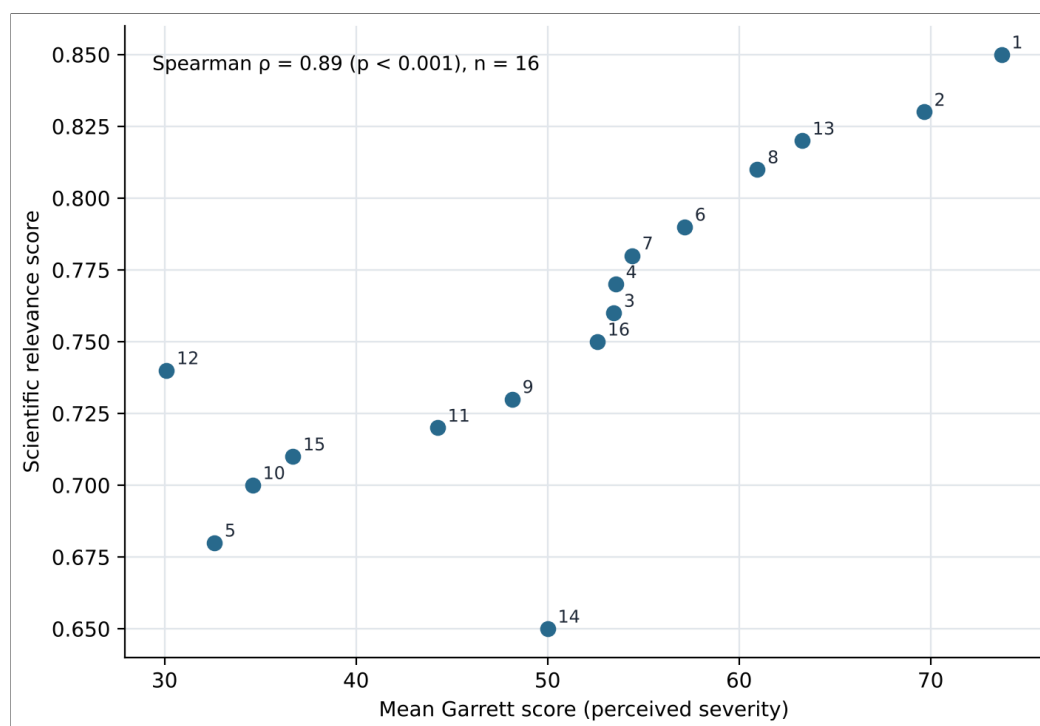


Figure 4. Relationship between perceived severity (mean Garrett score) and scientific relevance score; point labels correspond to S. No. in Tables 1 and 2

Overall, the major constraints to adoption were inadequate training facilities, limited technical knowledge, poor record keeping, delayed veterinary services and inadequate access to hygienic milk-production equipment.

4. Conclusion

Adoption of recommended dairy farming practices in western Uttar Pradesh was constrained mainly by inadequate training facilities, limited technical knowledge, poor record management, delayed veterinary services and weak infrastructural support. Lack of training facilities was the most severe constraint, followed by inadequate knowledge about pedigree enquiry and unavailability of appropriate utensils for quality milk production. All constraints were validated as scientifically relevant, and farmers' perceptions closely matched expert judgement.

To improve adoption, extension agencies should organise practical, farmer-centred and location-specific training programmes. Veterinary service delivery should be strengthened, with timely availability of vaccines and medicines, and hygienic milk handling and systematic record keeping should be actively promoted. Extension strategies should emphasise low-cost, practical technologies such as silage making, clean drinking-water management, balanced feeding, disease prevention and scientific housing. Together, these measures can narrow the technology gap, raise milk yield and quality, and improve the livelihoods of dairy farmers in western Uttar Pradesh.

References

1. Department of Animal Husbandry and Dairying (DAHD). Annual report 2023–24. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, New Delhi; 2024.
2. Meena DC, Parandiyal AK, Dileep K, Maina K. Role of livestock sector in sustainable livelihood security in Yamuna ravine area of Uttar Pradesh. *Indian Research Journal of Extension Education*. 2022;22(3):10–17.
3. Kumar A, Singh R, Kumar B, Ali N, Sahu DS, Kumar A. Constraints in adoption of improved dairy husbandry practices in Western Uttar Pradesh. *Journal of Community Mobilization and Sustainable Development*. 2019;14(3):397–402.
4. Murai AS, Singh BK. Differential adoption of scientific dairy farming practices and related constraints. *Indian Research Journal of Extension Education*. 2011;11(2):46–49.
5. Kumar A, Verma HC, Singh N, Verma RK, Yadav K, Gond SP, Yadav D, Tiwari S. Constraints faced by dairy farmers in adoption of entrepreneurial behaviours in Ayodhya district of Uttar Pradesh. *International Journal of Agriculture Extension and Social Development*. 2024;7(8):408–410.
6. Rawat U, Singh SK, Singh A, Khandait V, Rashmi. Constraints perceived in using livestock-based mobile applications by dairy farmers in Uttar Pradesh. *International Journal of Livestock Research*. 2025;15(2):15–21.

7. Yadav S, Shruti, Singh M, Verma H, Kumar T, Singh A, Kujur N. Challenges in adoption of improved feeding practices among dairy farmers: A Friedman ranking analysis. *International Journal of Agriculture Extension and Social Development*. 2026;9(Special Issue 2):71–77.
8. Dhanavandan S. Application of Garrett ranking technique: Practical approach. *International Journal of Library and Information Studies*. 2016;6(3):135–140.
9. Garrett HE, Woodworth RS. *Statistics in psychology and education* (6th ed.). Vakils, Feffer and Simons Pvt. Ltd., Bombay; 1969.
10. Radhika V, Lakshmi VV, Kumari DR, Prasuna M, Meena A. Application of Garrett ranking method to evaluate soil fertility practices among small and marginal farmers. *Agriculture Association of Textile Chemical and Critical Reviews Journal (AATCC Review)*. 2023;11(3):406–412.
11. Roy S, Rangnekar DV. Farmer Participatory Need-based Extension (FPNE) approach: A sustainable model adopted by co-operative milk unions in Andhra Pradesh, India. *Livestock Research for Rural Development*. 2007;19(10):Article 144.
12. Kumar S, Kumar B, Kumar R, Sankhala G. Farmers' opinion to reduce the constraints in scientific dairy farming practices—a case study. *Indian Journal of Animal Sciences*. 2012;82(7):762–766.

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