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Ashwani Kumar

Assistant Professor,
Department of Agricultural
Extension, CSSS PG College,
Machhra-250106, Meerut, UP,
India

Chandan Kumar Rai

Assistant Professor,
Department of Agricultural
Extension, CSSS PG College,
Machhra-250106, Meerut, UP,
India

Omkar Tiwari

Ex-Hod, Department of
Agricultural Extension, ASPG
College, Lekhaoti,
Bulandshahr, Uttar Pradesh,
India

Knowledge of dairy farmers about Improved dairy farming practices: A case of western up

Ashwani Kumar¹, Chandan Kumar Rai², Omkar Tiwari³

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ABSTRACT

The present study was conducted to assess the knowledge level of dairy farmers regarding improved dairy farming practices in Western Uttar Pradesh. The study employed an ex-post facto research design with a sample of 200 dairy farmers selected from eight villages across Meerut and Saharanpur districts using multistage random sampling technique. Data were collected through well-structured interview schedules and analyzed using frequency, percentage, mean, and rank statistics. The findings revealed that majority of respondents possessed medium level of knowledge across all practice categories: breeding practices (52.50%), feeding practices (55.00%), management practices (51.00%), and health care practices (79.00%). The overall knowledge level showed 53.00 percent farmers with medium knowledge, 35.00 percent with low knowledge, and only 12.00 percent with high knowledge. Practice-wise analysis indicated breeding practices ranked first (71.40% knowledge score), followed by feeding practices (65.10%), management practices (59.50%), and health care practices (53.07%). The study concludes that extension agencies need to strengthen training programmes, seminars, and awareness campaigns to improve technical knowledge among dairy farmers, particularly in health care and management practices.

Keywords: Dairy farming, Knowledge level, Improved practices, Extension services, Western Uttar Pradesh

Introduction

Dairy farming constitutes a critical component of India's agricultural economy, providing livelihood security and supplementary income to millions of rural households, particularly small and marginal farmers. India has emerged as the world's largest milk-producing country, and the dairy sector plays an important role in supporting rural livelihoods, nutritional security and agricultural income. Dairy farming is particularly important for smallholders because livestock can provide regular cash income and serve as an important component of mixed crop-livestock farming systems. The productivity and profitability of dairy enterprises, however, depend substantially on the adoption of appropriate breeding, feeding, management, health-care and clean-milk-production practices (Rogers, 2003; Jugal *et al.*, 2021) [2, 1]. Uttar Pradesh occupies an important position in India's dairy sector and has a large population of cattle and buffaloes. Nevertheless, the availability of livestock resources does not necessarily translate into optimum productivity because production performance is influenced by farmers' access to knowledge, extension services, quality inputs, veterinary facilities and their adoption of scientific management practices. Recent research in Uttar Pradesh has demonstrated considerable variation in farmers' knowledge of good dairy farming practices. Singh *et al.* (2024) [3], for example, reported that only 48.79 per cent of dairy farmers studied had overall knowledge regarding good dairy farming practices, with substantial differences in knowledge of breeding, feeding, calf management, health care and general management practices. Knowledge is an important prerequisite for the adoption of innovations because farmers must first become aware of an innovation, understand its characteristics and develop sufficient understanding to make informed adoption decisions (Rogers, 2003) [2]. Studies on dairy farmers have demonstrated that knowledge deficiencies occur across several major components of dairy production. Chaudhary *et al.* (2024) [4] reported that the majority of dairy farmers in Anand district had a medium level of knowledge regarding scientific dairy farming practices, including breeding, feeding, health care and management. Similarly, Kapadiya *et al.* (2022) [5] found considerable variation in farmers' knowledge of individual scientific dairy practices, with relatively high knowledge of some basic practices but comparatively lower knowledge of mineral-mixture feeding, udder and teat hygiene, full-hand milking, treatment of sick animals and scientific heifer management. In Uttar Pradesh, dairy farmers also exhibit substantial information needs regarding scientific dairy husbandry. Singh *et al.* (2018) [6] reported that farmers had high information requirements concerning feeding and watering, breeding, health care, management, fodder production and marketing. Important information gaps were identified in areas such as recommended feeding practices, mineral-mixture use, estrus detection, appropriate timing of artificial insemination, pre

Corresponding Author:

Ashwani Kumar

Assistant Professor,
Department of Agricultural
Extension, CSSS PG
College, Machhra-250106,
Meerut, UP, India

ventive health care, vaccination schedules, calf management and clean milk production. These findings demonstrate the importance of strengthening agricultural and livestock extension systems to provide location-specific and need-based information to dairy farmers. The situation is particularly relevant in Western Uttar Pradesh, where dairy farming forms an important component of the mixed farming system. Empirical evidence from Saharanpur district indicates that dairy farmers face several constraints affecting the adoption of improved dairy husbandry practices. Kumar *et al.* (2019) [7], in a study of 200 dairy farmers in Saharanpur district, identified repeat breeding and prolonged calving intervals, inadequate animal-health practices, high veterinary-medicine costs, non-remunerative milk prices, high feed costs and inadequate housing facilities as important constraints. The authors emphasized the need for awareness programmes and need-based training to improve farmers' capacity to adopt improved dairy husbandry practices. Evidence from other parts of India further indicates that considerable gaps may exist between recommended scientific practices and farmers' actual practices. Sood *et al.* (2020) [8] reported substantial adoption gaps among commercial dairy farmers in Punjab, particularly in health care (47.4%), feeding management (42.9%) and calf management (31.0%). The study identified deficiencies in practices such as herd screening for mastitis and tuberculosis, silage preparation, feed processing, UMMB feeding, calf-scour management, foot-bath facilities and insurance of dairy animals. Similarly, Singh and Singh (2020/2021) [9] observed that several scientific dairy practices in South-Western Punjab were not adequately adopted, particularly feed and fodder analysis, silage preparation, urea treatment of straw and appropriate animal-waste disposal. The relationship between knowledge, learning and adoption is also evident from extension-training interventions. Chander *et al.* (2022) [10] reported that specialized dairy training programmes resulted in substantial gains in farmers' knowledge and adoption of practices such as clean milk production, balanced feeding and deworming. Their findings demonstrate the potential of structured training and extension interventions for improving farmers' knowledge and subsequently encouraging the adoption of scientific dairy practices. More recent evidence from dairy farming systems also indicates that farmers tend to adopt some production-oriented practices more readily than practices related to feed quality, mineral supplementation, insurance, marketing and institutional support, highlighting the need for domain-specific extension strategies. Recent research specifically involving dairy farmers of Meerut and Hapur districts has also examined the relationship between knowledge, attitude and adoption of artificial insemination technology. Such evidence is particularly relevant to Western Uttar Pradesh because reproductive management is a major determinant of dairy productivity and profitability. The study indicates that knowledge and attitude are important dimensions associated with farmers' adoption of artificial insemination, reinforcing the need to assess farmers' understanding of scientific breeding technologies alongside other dairy-management practices. Despite the importance of dairy farming in Western Uttar Pradesh, there remains a need for comprehensive assessment of farmers' knowledge across the major domains of dairy production, particularly breeding, feeding, management and health care. Knowledge assessment can identify specific deficiencies in farmers' understanding of recommended practices and can help extension agencies design more targeted training programmes, demonstrations, farmer advisory services and information-dissemination strategies. Therefore, systematic assessment of the knowledge level of dairy farmers in Western Uttar Pradesh is essential

for identifying domain-specific knowledge gaps and developing need-based extension interventions aimed at improving adoption, productivity, profitability and sustainability of dairy farming (Rogers, 2003; Singh *et al.*, 2018; Kumar *et al.*, 2019; Chander *et al.*, 2022; Singh *et al.*, 2024) [10, 7, 2, 3, 6].

Methodology

Research design

The present study was undertaken in Meerut and Saharanpur districts of Western Uttar Pradesh. An "ex-post facto design" was employed in the present investigation as the events (knowledge acquisition and farming practices) had already occurred, and this design was considered appropriate for such studies (Kerlinger, 1976) [11]. This research design enabled the investigator to study the existing knowledge levels without manipulating any variables.

Study area and sampling procedure

A multistage random sampling technique was adopted for the selection of the study area and respondents:

Stage I: Meerut and Saharanpur districts were selected randomly from Western Uttar Pradesh.

Stage II: Two blocks from each selected district were chosen randomly, resulting in four blocks total.

Stage III: From each selected block, two villages were selected randomly, making a total of eight villages.

Stage IV: From each selected village, 25 dairy farmers were selected randomly, resulting in a total sample size of 200 dairy farmers (8 villages $\times$ 25 respondents = 200 respondents).

Data collection

Primary data were collected through direct personal investigation using a well-structured and pre-tested interview schedule. The knowledge score was calculated by assigning one mark for each correct response, with higher scores indicating better knowledge levels.

Knowledge level categorization

Respondents were categorized into three knowledge levels based on their percentage scores:

- **Low knowledge:** < 54 percent knowledge score
- **Medium knowledge:** 54-74 percent knowledge score
- **High knowledge:** > 74 percent knowledge score

For practice-wise analysis, similar categorization was done based on the respective score ranges for each practice domain.

Statistical analysis

The collected data were compiled, tabulated, and analyzed using appropriate statistical tools. The statistical parameters employed included frequency distribution, percentage analysis, mean scores and rank order. The data were analyzed using SPSS software, and results were presented in tabular form for clarity and interpretation.

Results and discussion

Knowledge about dairy farming practices

The knowledge level of dairy farmers regarding improved dairy farming practices was analyzed across four major domains: breeding, feeding, management, and health care practices. The findings are presented in Table 1.

Table 1. Distribution of dairy farmers according to Knowledge level on dairy farming practices ($n = 200$)

Practices	Category	Frequency	Percentage
Breeding practices (Range: 5-16) (Mean: 12.10)	Low (< 10)	45	22.50
	Medium (10-14)	105	52.50
	High (> 14)	50	25.00

(continued on next page)

Practices	Category	Frequency	Percentage
Feeding practices (Range: 7-15) (Mean: 12)	Low (< 11)	57	28.50
	Medium(11-15)	110	55.00
	High(> 15)	33	16.50
Management practices (Range: 11-25) (Mean: 18.30)	Low (< 16)	65	32.50
	Medium (16-20)	102	51.00
	High (> 21)	33	16.50
Health care practices (Range: 6-14) (Mean: 8.4)	Low (< 7)	16	8.00
	Medium (7-11)	158	79.00
	High (> 11)	26	13.00

Breeding practices knowledge

Results in Table 1 indicate that 52.50 percent of respondents had a medium level of knowledge regarding breeding practices, while 25.00 percent demonstrated a high level and 22.50 percent a low level of knowledge. The mean knowledge score for breeding practices was 12.10 out of a maximum of 16, indicating moderately good knowledge in this domain. This finding suggests that dairy farmers in the study area have reasonable awareness about breeding-related practices such as artificial insemination timing, heat detection symptoms, and breeding intervals. The relatively higher knowledge in breeding practices could be attributed to extensive government and private sector interventions in artificial insemination services, regular veterinary visits, and widespread availability of breeding services in the study area. A similar finding was reported by Sharma (2005), who observed that majority of dairy farmers in Punjab possessed medium to high knowledge about breeding practices due to effective extension support and veterinary service delivery. The present findings align with these observations, indicating consistent patterns across different regions.

Feeding practices knowledge

The perusal of Table 1 shows that a majority of respondents (55.00%) possessed a medium level of knowledge about feeding practices; 28.50 percent had a low level and 16.50 percent had a high level of knowledge. The mean knowledge score was 12.00 out of 15, suggesting adequate but not excellent knowledge about feeding management. The moderate knowledge level in feeding practices indicates that while farmers are aware of basic feeding requirements such as green fodder provision and concentrate supplementation, they lack comprehensive knowledge about advanced practices like silage making, mineral mixture supplementation, balanced ration formulation, and phase-wise feeding. This knowledge gap may limit the optimal utilization of available feed resources and constrain milk production potential. This finding is supported by Gill and Minas (1978), who reported similar patterns of feeding knowledge among dairy farmers in Haryana. They attributed the knowledge gaps to limited exposure to modern feeding technologies and inadequate training programmes on scientific feeding management.

Management practices knowledge

Table 1 showed that 51.00 percent of respondents had medium level of knowledge of management practices, whereas 16.50 percent had high and 32.50 percent had low level of knowledge. The mean score of 18.30 out of 25 indicates substantial scope for improvement in management-related knowledge. Management practices encompass a wide range of activities including deworming schedules, milking hygiene, dehorning procedures, heat stress management, record keeping, and udder care. The relatively lower knowledge in this domain (32.50% low category) suggests that farmers may not be fully aware

of the importance of systematic management practices in enhancing productivity and animal welfare. These findings are in accordance with the findings reported by Gill and Minas (1978), who also documented moderate knowledge levels about management practices among dairy farmers. The consistency of findings across different studies and regions indicates a systemic issue requiring targeted extension interventions.

Health care practices knowledge

It can be observed from Table 1 that majority of the respondents (79.00%) possessed medium level of knowledge of health care practices, followed by low and high knowledge levels which account for 8.00% and 13.00% respectively. The mean knowledge score was 8.40 out of 14, the lowest among all practice domains. The high concentration of respondents in the medium category (79.00%) with very few in the high category (13.00%) indicates that while farmers have basic awareness about vaccination and disease treatment, they lack comprehensive knowledge about preventive health care, quarantine management, disease identification, and biosecurity measures. This knowledge gap poses significant risks to animal health and farm productivity. The similar finding was observed by Deepak (2004), who reported that health care knowledge was particularly weak among dairy farmers in Uttar Pradesh. The consistency of this finding across studies spanning two decades suggests persistent gaps in health care extension services that need urgent attention.

Overall knowledge level of dairy farmers regarding improved dairy farming practices

The overall knowledge level of dairy farmers regarding improved dairy farming practices was computed by aggregating scores across all four practice domains. The distribution is presented in Table 2. According to Table 2, it was observed that 53.00 percent respondents had medium level of overall knowledge, whereas 12.00 percent had high and 35.00 percent had low level of overall knowledge. The finding is in conformity with the empirical evidences reported by Sharma (2005), who also documented predominantly medium knowledge levels among dairy farmers. The distribution pattern reveals a concerning scenario: only 12.00 percent of farmers possess high knowledge about improved dairy farming practices, while more than one-third (35%) have low knowledge. This indicates substantial knowledge gaps that constrain the adoption of improved technologies and limit productivity enhancement. It was found that majority of respondents were having medium level of knowledge in all the fields of dairy management practices. This might be due to weakness of extension agencies in imparting technical knowledge by organizing training programmes, seminars, and camps in order to bring awareness among farmers. The limited reach of extension services, coupled with inadequate frequency and quality of training programmes, appears to be a major constraint in knowledge enhancement.

Table 2. Distribution of dairy farmers according to their overall knowledge level regarding improved dairy farming practices ((n = 200))

Sl. No.	Overall Knowledge Level	Frequency	Percentage
1.	Low (< 54 percent knowledge score)	70	35.00

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Sl. No.	Overall Knowledge Level	Frequency	Percentage
2.	Medium (54-74 percent knowledge score)	106	53.00
3.	High (> 74 percent knowledge score)	24	12.00

Practice wise overall knowledge level of dairy farmers regarding improved dairy farming practices

To identify priority areas for extension interventions, practice-wise knowledge scores were computed and ranked. The results are presented in Table 3.

Table 3 reveals that breeding practices ranked first with 71.40 percent knowledge score, followed by feeding practices (65.10%, Rank II), management practices (59.50%, Rank III), and health care practices (53.07%, Rank IV). The higher knowledge score in breeding practices (71.40%) reflects the relatively better extension support and service delivery in this domain, particularly through artificial insemination

programmes and veterinary services. However, even this "best" practice domain shows only 71.40% knowledge, indicating room for improvement. The lowest knowledge score in health care practices (53.07%) is particularly concerning, as animal health directly impacts productivity, profitability, and farm sustainability. This finding underscores the urgent need for enhanced extension efforts in health care management, including vaccination programmes, disease prevention training, and biosecurity awareness. The ranking pattern suggests that extension agencies should prioritize health care and management practices in their training programmes, while maintaining and strengthening breeding and feeding practice knowledge.

Table 3. Practice wise level of knowledge about improved dairy farming practices ($n = 200$)

Sl. No.	Practices	Percentage	Rank
1.	Breeding practices	71.40	I
2.	Feeding practices	65.10	II
3.	Management practices	59.50	III
4.	Health care practices	53.07	IV

These findings align with the diffusion of innovations theory (Rogers, 2003) [2], which posits that knowledge is the first and essential step in the adoption process. Without adequate knowledge, farmers cannot make informed decisions about technology adoption, leading to sub-optimal productivity and profitability. The study findings also support the human capital theory, which emphasizes that investment in farmer knowledge and skills enhances productivity and economic outcomes (Becker, 1993) [12]. The observed knowledge gaps represent a significant human capital deficit that constrains the dairy sector's growth potential.

Conclusion

The present study concludes that dairy farmers in Western Uttar Pradesh possess predominantly medium levels of knowledge about improved dairy farming practices across all domains. Only 12% of farmers demonstrated high knowledge levels, while 35% had low knowledge, indicating substantial scope for knowledge enhancement through targeted extension interventions. Breeding practices showed the highest knowledge level (71.40%), followed by feeding (65.10%), management (59.50%), and health care practices (53.07%). The particularly low knowledge in health care practices is concerning and requires immediate attention from extension agencies. The study recommends that extension agencies strengthen their training programmes, seminars, and awareness campaigns, with special focus on health care and management practices. Priority should be given to organizing regular training programmes on improved dairy management, conducting demonstration camps on improved practices, developing and disseminating extension materials in local language, strengthening veterinary service delivery and farmer-veterinarian linkages, promoting farmer-to-farmer knowledge sharing through success stories, utilizing digital platforms for knowledge dissemination and establishing dairy farmer groups for collective learning. Addressing these knowledge gaps through effective extension strategies will enhance the adoption of improved dairy farming practices, leading to increased productivity, profitability, and sustainability of dairy farming in Western Uttar Pradesh.

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