



Adoption of Scientific Dairy Farming Practices Among Dairy Farmers in Tamil Nadu, India

Naresh Kumar V., Mukilan M., Ambili S., Gopi R.  and Subin K. Mohan

Dept. of Veterinary and Animal Husbandry Extension, College of Veterinary and Animal Sciences, Mannuthy, Kerala Veterinary and Animal Sciences University, Kerala (680 651), India



Corresponding  drgopiext@gmail.com

 0000-0002-6203-7445

ABSTRACT

The present study was undertaken from April, 2025 to May, 2025 in the Dharmapuri district of Tamil Nadu to assess the level of adoption of scientific dairy farming practices among dairy farmers. Data were collected from 60 dairy farmers selected from five villages of Harur block using a pre-tested structured interview schedule. The results indicated that the majority of the respondents were older farmers with high farming experience and medium livestock possession. Further, 63.33% of the respondents had a medium level of overall adoption of scientific dairy farming practices, while 20.00% and 16.67% exhibited high and low levels of adoption respectively. Among breeding practices, artificial insemination and drying of animals before calving recorded higher adoption levels. In feeding practices, colostrum feeding and green fodder cultivation were widely adopted, whereas mineral mixture feeding showed lower adoption. In health care practices, vaccination and isolation of sick animals were highly adopted. In contrast, marketing and general information practices such as cattle insurance, credit utilisation and awareness of government schemes exhibited lower adoption levels. The findings indicated a clear gap between production-oriented and market-oriented practices among dairy farmers in the study area. The results provided useful insights for designing need-based extension strategies to improve adoption levels. The study highlighted the need to strengthen extension efforts and institutional support to improve the adoption of market-oriented and general management practices, thereby enhancing the livelihoods of dairy farmers in the study area.

KEYWORDS: Adoption, scientific dairy farming, dairy farmers, Tamil Nadu

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Data Availability Statement: Legal restrictions are imposed on the public sharing of raw data. However, author have full right to transfer or share the data in raw form upon request subject to either meeting the conditions of the original consents and the original research study. Further, access of data needs to meet whether the user complies with the ethical and legal obligations as data controllers to allow for secondary use of the data outside of the original study.

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1. INTRODUCTION

Livestock plays a vital role in the Indian economy by contributing to livelihood security, employment, income and nutritional support to Indian households (Kumar et al., 2016; Vekariya et al., 2016). It is estimated that about 20.5 million people in India depend on livestock for their livelihood and nearly two-thirds of the rural population derive income and employment from this sector. The livestock sector employs about 8.8% of India's population (Anonymous, 2025a). For these households, livestock serves as a crucial coping mechanism during periods of crop failure, while also contributing to household income, food security and nutritional well-being (Birthal and Jha, 2005). Within the livestock sector, dairying is one of the most important economic activities, contributing about 67% to the total value of output of the livestock sub-sector, which exceeds the combined contribution of major crops such as wheat and paddy (Yadav and Naagar, 2021). India has the largest livestock population in the world, with about 193.46 million cattle and 109.85 million buffaloes, contributing to a total livestock population of 536.76 million (Anonymous, 2019). In India, cows contribute approximately 43% and buffaloes about 32% of the total milk production. India accounts for about 25% of global milk production, maintaining its position as the largest milk producer in the world. India's milk production has grown at an annual rate of around 6%, which is significantly higher than the global average growth rate of about 2% (Kona et al., 2025). The dairy sector has experienced substantial growth in recent years, with milk production increasing from 146.31 mt in 2014–15 to 247.87 mt in 2024–25 (Anonymous, 2025b). Similarly, per capita availability of milk increased from 303 g day⁻¹ to 485 g day⁻¹ during the same period, which is higher than the recommended level of 300 g day⁻¹ by the Indian Council of Medical Research (Anonymous, 2024). Despite this progress, dairy animal productivity in India averages nearly 6 kg per day, which is substantially below the global average of approximately 20 kg day⁻¹ (Kona et al., 2025). Efficient dairy farming depends on the adoption of appropriate livestock management practices, including scientific feeding, breeding, healthcare and general management. Practices such as vaccination, deworming and timely treatment are essential for maintaining animal health and improving productivity (Singh et al., 2007; Choudhary et al., 2022; Lawale et al., 2023; Meena et al., 2024). The technical knowledge of dairy farmers regarding breeding, feeding and management practices largely determines the success or failure of dairy farming (Islam et al., 2016; Sahu et al., 2017). Adoption is defined as the decision to make full use of an innovation as the best course of action available (Rogers, 1983). It is a process involving awareness creation, attitude formation and the development of favourable conditions

that lead to the acceptance and utilisation of innovations (Felix et al., 2022). Assessment of the adoption level of scientific dairy farming practices helps identify existing technological gaps and provides valuable information for designing suitable extension interventions (Gupta et al., 2008). Such information is essential for policymakers, planners and development agencies to formulate effective dairy development programmes. However, region-specific information regarding the adoption of scientific dairy farming practices in the Dharmapuri district of Tamil Nadu remains limited. Therefore, the present study was undertaken to assess the extent of adoption of scientific dairy farming practices among dairy farmers in the study area.

2. MATERIALS AND METHODS

The study was conducted from April, 2025 to May, 2025 in the Dharmapuri district of Tamil Nadu, which was purposively selected for the present study. The district was located in the north-western part of Tamil Nadu between 11°47'40" to 12°33'40" N latitude and 77°33'30" to 78°40'00" E longitude. It was one of the drought-prone and socio-economically backward districts of the state, where livestock played a significant role in livelihood security.

Among the six blocks of the district, viz., Dharmapuri, Nallampalli, Morappur, Harur, Pappireddipatti and Pennagaram, Harur block was selected purposively based on its prominence in dairy farming. From the selected block, five villages, viz., Ellapudaiyampatti, Keeraipatti, Kelaparai, Muthanoor and Ettiyampatti, were selected purposively. From each village, twelve dairy farmers were selected using simple random sampling, constituting a total sample size of 60 respondents. Data were collected using a pre-tested structured interview schedule.

The selected scientific dairy farming practices were categorised into four major components, viz., feeding, breeding, health care and, marketing and general management practices. The level of adoption for each practice was measured using a three-point continuum, viz., fully adopted, partially adopted and not adopted, with scores of 2, 1 and 0 respectively. The adoption index was calculated for each practice using the following formula:

Adoption index (AI) = (Score obtained by an individual / Maximum possible score) × 100

The respondents were further classified into low, medium and high categories of overall adoption based on the mean and standard deviation of the total adoption scores.

3. RESULTS AND DISCUSSION

3.1. Socio-economic profile of dairy farmers

3.1.1. Age

The findings presented in Table 1 revealed that 68.34% of

Sl. No.	Variables	Categories	Frequency	Percentage
1.	Age	Young (Up to 35)	11	18.33
		Middle (36-45)	8	13.33
		Old (Above 45)	41	68.34
2.	Sex	Male	40	66.67
		Female	20	33.33
3.	Education			
	Illiterate	24	40	
		Can read only	1	1.67
		Can read and write	1	1.67
		Primary school	10	16.67
		Middle school	15	25
		High school	5	8.33
		College and above	4	6.66
4.	Occupation	Dairying alone	1	1.67
		Dairying+Agriculture	55	91.67
		Dairying+Agriculture+Others	4	6.66
5.	Family type	Nuclear family	27	45
		Joint family	33	55
6.	Family size	Up to 5 members	21	35
		More than 5 members	39	65
7.	Farming experience	Low (Up to 5 years)	6	10
		Medium (6–10 years)	18	30
		High (More than 10 years)	36	60
8.	Livestock possession (4.68±2.046)	Low	5	8.33
		Medium	46	76.67
		High	9	15.00
9.	Social participation	No membership	0	0
		Member in one organisation	60	100
		Membership in more than one organisation	0	0
		Office bearer in one organisation	0	0
		Office bearer in more than one organisation	0	0
10.	Innovativeness	Adopt an innovation as soon as it	7	11.66
		Adopted innovations after seeing the adoption of other farmers	43	71.67
		Preferred to wait and taken their own time	10	16.67

the respondents belonged to the old age category (above 45 years), followed by the young (18.33%) and middle age categories (13.33%). The predominance of older respondents indicated that dairy farming was largely practised by older farmers in the study area. Similar findings were reported by Kalaivani et al. (2017), who observed that older farmers

were more actively involved in livestock rearing and related agricultural activities.

3.1.2. Gender

The findings revealed that 66.67% of the respondents were male, while 33.33% were female. The higher proportion of male respondents indicated their greater involvement

in decision-making related to dairy farming activities in the study area. Although women actively participated in various dairy farming operations, male household members were more often regarded as the heads of households and primary decision-makers and were therefore more likely to participate in the interview process. The present findings were in contrast with those reported by Kalaivani et al. (2017).

3.1.3. Education

The findings indicated that 40% of the respondents were illiterate, followed by 25% who had completed middle school education, primary school education (16.67%), high school education (8.33%) and college education and above (6.66%). The higher proportion of illiterate respondents indicated a relatively low level of education among dairy farmers in the study area, which might have limited their access to scientific information and their adoption of improved dairy farming practices. These findings were in accordance with those reported by Vidya et al. (2009) among dairy farmers in Kannur district of Kerala.

3.1.4. Occupation

The findings revealed that a majority of the respondents (91.67%) were engaged in dairying along with agriculture followed by dairying, agriculture and other family occupations (6.66%). Only 1.67% of the respondents depended exclusively on dairying. The findings indicated that dairy farming was commonly practised as a subsidiary occupation along with other livelihood activities. Similar findings were reported by Kumar et al. (2016), who observed that dairying alone did not provide sufficient income and that farmers often engaged in multiple occupations such as agriculture and other family activities to supplement their household income.

3.1.5. Family type

The results revealed that 55% of the respondents belonged to joint families, whereas 45% belonged to nuclear families. The predominance of joint families indicated the continued existence of traditional family structures in the study area. The present findings differed from those reported by Kumar et al. (2016) and Kalaivani et al. (2017).

3.1.6. Family size

The findings indicated that 65% of the respondents had family sizes of more than five members, while 35% had up to five members. The higher proportion of large families might be attributed to the predominance of joint family systems in the study area.

3.1.7. Farming experience

The results revealed that 60% of the respondents had a high level of farming experience, followed by medium (30%) and low (10%) levels of experience. The higher

farming experience of the respondents indicated their long-term involvement in dairy farming activities. Dairy farming was found to be an important source of livelihood for the respondents, which might have encouraged them to continue the practice over the years. Similar findings were reported by Vidya et al. (2009) among dairy farmers in Kerala.

3.1.8. Livestock possession

The results revealed that a majority of the respondents (76.67%) belonged to the medium category of livestock possession, followed by the high (15%) and low (8.33%) categories. The predominance of respondents in the medium category indicated that most dairy farmers maintained a moderate herd size.

3.1.9. Social participation

The findings revealed that all respondents (100%) were members of one organisation. In contrast, none of them reported membership in more than one organisation or held any office-bearer position in the study area. The findings indicated that respondents had membership in only one organisation and did not occupy leadership positions. The present findings were in line with those reported by Vekariya et al. (2016) among dairy farmers in Gujarat.

3.1.10. Innovativeness

The results revealed that a majority of the respondents (71.67%) adopted innovations after observing their adoption by other farmers, followed by those who preferred to wait and take their own time before adoption (16.67%) and those who adopted innovations immediately upon becoming aware of them (11.66%). The findings suggested that most dairy farmers preferred to observe the performance of innovations before adopting them.

3.2. Adoption of improved breeding practices

3.2.1. Distribution of dairy farmers based on the adoption of improved breeding practices

The findings presented in Table 2 indicated that artificial insemination was ranked first with an adoption score of 120 (AI=100), followed by drying of animals two months before calving (AI=98.33) and proper timing of insemination (AI=96.67). Selection of breed (AI=61.67) and pregnancy diagnosis (AI=37.50) were ranked fourth and fifth respectively.

The higher adoption of artificial insemination and related practices might be attributed to improved access to veterinary services, increased awareness among farmers and government supported programmes that promoted artificial insemination. In contrast, the lower adoption of pregnancy diagnosis might be attributed to the tendency of farmers to assume that animals were pregnant if they did

Table 2: Adoption of scientific dairy farming practices (n=60)

Sl. No.	Practices	Total score	Adoption index	Rank
A. Breeding practices				
1.	Selection of breed	74	61.67	4
2.	Drying of animals two months before calving	118	98.33	2
3.	Time of insemination	116	96.67	3
4.	Artificial insemination	120	100	1
5.	Pregnancy diagnosis between 45–90 days	45	37.50	5
B. Feeding practices				
6.	Feeding colostrum to newborn calves	120	100	1
7.	Feeding extra rations for a pregnant cow	41	34.17	3
8.	Feeding a concentrate mixture based on milk production and body weight	40	33.33	4
9.	Feeding of mineral mixture	10	8.33	5
10.	Green fodder cultivation	113	94.17	2
C. Health care management practices				
11.	Disinfection of the navel cord	59	49.17	4
12.	Deworming in calves	50	41.67	5
13.	Dehorning in calves	29	24.17	6
14.	Vaccination of animals	104	86.67	1
15.	Isolation of sick animals	76	63.33	2
16.	Clean milk production	63	52.50	3
D. Marketing and general information practices				
17.	Marketing of livestock products	25	20.83	2
18.	Government schemes	13	10.83	4
19.	Cattle insurance practice	15	12.50	3
20.	Loan facilities	5	4.17	5
21.	Weather forecasting	28	23.33	1

not return to heat after insemination in the study area. This lack of awareness and prevailing misconception reduced the perceived need for pregnancy diagnosis. These findings were in line with the results of (Murai and Singh, 2011; Mali et al., 2014; Jugal et al., 2021), who reported higher adoption of artificial insemination practices among dairy farmers in different regions of India.

3.2.2. Distribution of dairy farmers based on the adoption of improved feeding practices

The findings presented in Table 2 indicated that feeding of colostrum to newborn calves was ranked first with the highest adoption score of 120 (AI=100), followed by green fodder cultivation (AI=94.17). Feeding of extra concentrate to pregnant cows (AI=34.17), feeding of concentrate mixture based on milk yield (AI=33.33) and feeding of mineral mixture (AI=8.33) were ranked third, fourth and fifth respectively.

The increased adoption of colostrum feeding might be attributed to farmers' awareness of its importance in enhancing newborn calves' immunity through antibody transfer and its role as a natural laxative. These findings were in accordance with the results of Felix et al. (2022), who also reported higher adoption of colostrum feeding practices among dairy farmers. Similarly, the higher adoption of green fodder cultivation might be due to its perceived benefits in reducing feed costs, ensuring the year-round availability of nutritious fodder and improving milk production. The availability of fodder cultivation programmes, extension support and farmers' recognition of the economic advantages of green fodder cultivation might have further contributed to its higher adoption. In contrast, the lower adoption of practices such as feeding of mineral mixture and concentrate supplementation might be due to a lack of awareness, high cost and limited access to these inputs in the study area.

3.2.3. Distribution of dairy farmers based on the adoption of animal health care practices

The findings presented in Table 2 indicated that vaccination of animals was ranked first with an adoption score of 104 (AI=86.67), followed by isolation of sick animals (AI=63.33). Clean milk production (AI=52.50), disinfection of the navel cord (AI=49.17), deworming of animals (AI=41.67) and dehorning in calves (AI=24.17) were ranked third, fourth, fifth and sixth respectively. The higher adoption of vaccination practices might be attributed to increased awareness among farmers and the regular implementation of government programmes such as the National Animal Disease Control Programme, under which vaccination against diseases like foot-and-mouth disease was carried out periodically. Similar findings were reported by Kapadiya et al. (2022), who reported that higher adoption of vaccination practices among dairy farmers in Gujarat. Similarly, the relatively higher adoption of isolation of sick animals might be due to farmers' practical experience in preventing disease spread within the herd. Similar findings regarding the adoption of isolation of sick animals were reported by Meena et al. (2017). In contrast, the lower adoption of practices such as deworming and dehorning might be due to a lack of awareness and the perception among farmers that these

practices were less essential for profitable dairy farming.

3.2.4. Distribution of dairy farmers based on the adoption of marketing and general information practices

The findings presented in Table 2 indicated that the use of weather forecasting was ranked first (AI=23.33), followed by marketing of livestock products (AI=20.83). Cattle insurance (AI=12.50), awareness of government schemes (AI=10.83) and utilisation of loan facilities (AI=4.17) were ranked third, fourth and fifth respectively.

Although the adoption level was low, weather forecasting recorded a relatively higher adoption index than other marketing and general information practices. This might be due to the ease of accessing weather-related information through various communication channels and its perceived usefulness in farm decision-making. In contrast, the lower adoption of practices such as cattle insurance and loan facilities might be due to a lack of awareness and procedural complexities. Farmers might also perceive these services as less accessible or less beneficial due to previous experiences. The lower adoption of insurance, government schemes and loan facilities indicated the need for greater awareness creation through government and non-government agencies.

3.2.5. Distribution of farmers based on the level of adoption of improved dairy farming practices

Table 3 presented the distribution of respondents according to their level of adoption of improved dairy farming practices. The respondents were classified into low, medium and high categories based on the mean and standard deviation of the adoption scores. Regarding breeding practices, the majority of dairy farmers (76.67%) had a medium level of adoption, followed by 13.33% and 10% of respondents in the high and low categories respectively. These findings were in line with those of Singh et al. (2010), who reported a similar pattern among dairy farmers in Haryana. In the case of

feeding practices, most respondents (58.33%) belonged to the medium category, followed by 26.67% in the low category and 15.00% in the high category. These findings were in accordance with those of Singh et al. (2010), who reported that the majority of dairy farmers in Haryana had a medium level of adoption of scientific feeding practices.

Regarding health care practices, the majority of respondents (58.33%) were observed in the medium category, followed by 21.67% in the high category and 20.00% in the low category. These results were consistent with the findings of (Meena et al., 2017). In terms of marketing and general information practices, 43.33% of the farmers were classified under the medium category, followed by 36.67% in the low category and 20.00% in the high category.

With respect to overall adoption, the majority of respondents (63.33%) had a medium level of adoption, while the remaining respondents were distributed between high (20.00%) and low (16.67%) categories. Similar findings were reported by Jugal et al. (2021), who observed that the majority of dairy farmers in Gujarat exhibited a medium level of adoption of improved animal husbandry practices.

The findings further indicated that dairy farmers exhibited relatively higher adoption levels in breeding, feeding and health care practices, whereas adoption of marketing and general information practices was comparatively low. This suggested that farmers were more focused on production-oriented aspects, with comparatively less emphasised on market-oriented and institutional practices. The findings also implied the need for greater focus by government and private institutions on strengthening marketing-oriented aspects and general practices such as livestock insurance, credit and value addition. Enhancing awareness and accessibility of these services could further improve the livelihoods of dairy farmers.

Table 3: Level of adoption of different scientific dairy farming practices (n=60)

Level of adoption	Adoption of different scientific dairy farming practices				
	Breeding	Feeding	Health care	Marketing and general information	Overall
Low	8 (13.33%)	16 (26.67%)	12 (20.00%)	22 (36.67%)	10 (16.67%)
Medium	46 (76.67%)	35 (58.33%)	35 (58.33%)	26 (43.33%)	38 (63.33%)
High	6 (10.00%)	9 (15.00%)	13 (21.67%)	12 (20.00%)	12 (20.00%)

4. CONCLUSION

The majority of dairy farmers in the study area exhibited a medium level of adoption of scientific dairy farming practices. Higher adoption was observed in production-oriented practices such as breeding, feeding and health care.

However, lower adoption was observed in marketing and general information practices, including livestock insurance, credit utilisation and awareness of government schemes. The findings highlighted the need to strengthen extension efforts and institutional support to improve market-oriented practices and enhance the livelihoods of dairy farmers.

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