

Assessment of Dairy Farmers' Knowledge Regarding Good Dairy Farming Practices in Uttar Pradesh, India

Abstract

Dairy farming is essential for households with low and moderate-income, serving as a crucial component of both subsistence and commercial farming. The dairy sector holds significant potential and offers ample opportunities to enhance the socio-economic status of farmers due to its ability to generate higher productivity and profits within a shorter timeframe compared to other businesses. The study was conducted to measure dairy farmers' knowledge level regarding good dairy farming practices in Uttar Pradesh. Being the highest milk-producing state in India, Uttar Pradesh was selected purposively for the study. Further selection of districts, blocks, and villages for two each was done randomly. While selecting respondents, 10 percent of dairy farmers from the total household of each village were considered under a proportionate random sampling method. The criteria of the respondents were the dairy farmers should have at least one lactating dairy animal at the time of investigation. From the study, it was observed that 64.85 percent of respondents had knowledge about how many days is the colostrum-free milk available from animals and 81.21 percent of respondents knew about animals going to repeat their heat cycle. The majority (97.88%) of respondents had knowledge about colostrums feeding to newborn calves and 62.42 percent respondents had knowledge about special bedding for newborn calves. 84.24 percent of respondents had knowledge about ill animals and 56.36 percent of respondents had knowledge about the proper disposal of dung. 94.24 percent of respondents knew how many workers manage 5 animals on their farm. 48.79 percent of respondents had overall knowledge about good dairy farming practices. Study identified require a clear strengthening of extension services through targeted training programs to improve the knowledge of key practices among the farming community. Another low awareness is about schemes by the government on support to farmers in terms of finances and technical means. This can be improved through better communication channels by working with local cooperatives and NGOs.

Keywords: Animal, Dairy Farmers, Good Dairy Farming Practices, Knowledge, Milk.

Introduction

In 2022-23, India contributed an annual milk production of 230.58 million tons, which accounted for 24.64 percent of the world's production, making it a leading country in global milk production (NDDB, 2022-23). India's milk production has increased by 58 percent over the past nine years, specifically between 2014-15 and 2022-23 ((India Tracker, 2023). After agriculture, dairy farming is the second-largest economic activity in rural India (Sabapara *et al.*, 2013). The dairy industry plays a crucial role in reducing poverty in rural regions because over 80 percent of rural families own livestock that provides milk for consumption. These families also receive additional revenue from the sale of milk and draught power for agriculture (Rahman and Gupta, 2015). Dairy farming is a significant source of supplementary income for small farmers, marginal farmers, and agricultural laborers in the state.

Dairy farming is a crucial component of both subsistence and commercial agriculture, particularly for low- and middle-income households. Its potential to boost the socioeconomic standing of small, marginal farmers and agricultural laborers is immense. Compared to other agricultural sectors, dairy farming offers faster returns on investment, leading to increased income, employment, and overall economic growth. To maximize production and profitability, adopting sound dairy farming practices is essential. Key areas of focus include breeding, feeding, healthcare, animal welfare, hygienic milk production, environmental sustainability, and socioeconomic management. (NDDB, 2023 & Sharma, R. K. 2015).

With the implementation of Good Management Practices, farming technology has significantly progressed, yielding notable social benefits by addressing the health, safety, and welfare of farmers (Nain, *et.al.* 2020 and Raj Lakshmi *et al.*, 2023). Similarly, Good Dairy Farming Practices (GDFP) serve as a crucial global tool, aiding farmers in producing and marketing safe, high-quality milk and dairy products to meet the demands of both the food industry and consumers (FAO, 2011). Only a 12 percent adoption level was found regarding good dairy farming practices in Uttar Pradesh (Singh *et al.*, 2018) Significant disparities exist between good dairy farming practices and their implementation by dairy farmers. This may be attributed to an inadequate information transmission system, lack of compatibility, complexity, and a lack of observability of innovative procedures in dairy production. As a result of this factor, farmers are incapable of implementing effective management techniques in their dairy farming operations.

Hence, considering the aforementioned circumstances, it is crucial to assess the knowledge level among dairy farmers in Uttar Pradesh regarding good dairy farming practices.

Material and methods:

Central Plain Zone of Uttar Pradesh has been adopted as the area of the present study since it has the special feature of having the highest density of Indigenous breeds in the region. From this zone, two districts, Barabanki and Sitapur, had been sampled randomly to ensure equitable representation. Within each district, two blocks have been selected randomly; Masuali and Harakh from Barabanki district and Maholi and Biswan from Sitapur district.

Later, from each block, two villages were more allocated for study through random sampling. Concretely, Saidabad and Behta villages were taken from Masuali block in Barabanki, while Bhanmau and Mohana villages were taken from Harakh block. Likewise, in Sitapur district, Nekpur and Raipur villages were taken from Maholi block and Tikara and Haibatpur villages were taken from Biswan block.

The respondents were chosen through proportionate random sampling methods. From the total number of dairy farmers sampled in each selected village out of 18, 10 percent were sampled leaving a total of 330 dairy farmers. The selection requirement required that only those farmers with at least one lactating cow at the time of the study would be interviewed.

Data Collection Method: A pre-designed, pre-tested interview schedule was used for data collection. The interview schedule sought to explore knowledge of good dairy farming practices among dairy farmers. A special metric was constructed to evaluate the levels of these practices in terms of awareness of dairy farmers. The Knowledge Test Berk N at al 2010 consisted of “good dairy farming practices” concerning 7 areas: hygiene in milking, breeding, feeding, health of animals, welfare of animals, environmental, and socio-economic management practices.

The respondents’ completion of these statements was assessed, with a value of one awarded for a correct answer and zero for a wrong answer. Each respondent's total knowledge score was derived using the formula shown below:

$$\text{Knowledge} = \frac{\text{Obtained score}}{\text{Maximum possible score}} \times 100$$

This enabled recoding the data whereby the knowledge of the respondents was able to be presented in terms of percentage or fraction of the attainable score thus enhancing uniformity in comparison of different respondents.

Analysis of collected data: Upon retrieval of the data, the data was organized, compressed and presented in an appropriate manner as per the statistical tools used. In describing the data, basic statistical measures including mean, standard deviation, and percentage were employed to explore the knowledge of the respondents on the seven dimensions of dairy farming practices. These rigorous quantitative analyses sought to pinpoint important gaps in knowledge and where additional assistance or training among the farmers would be necessary.

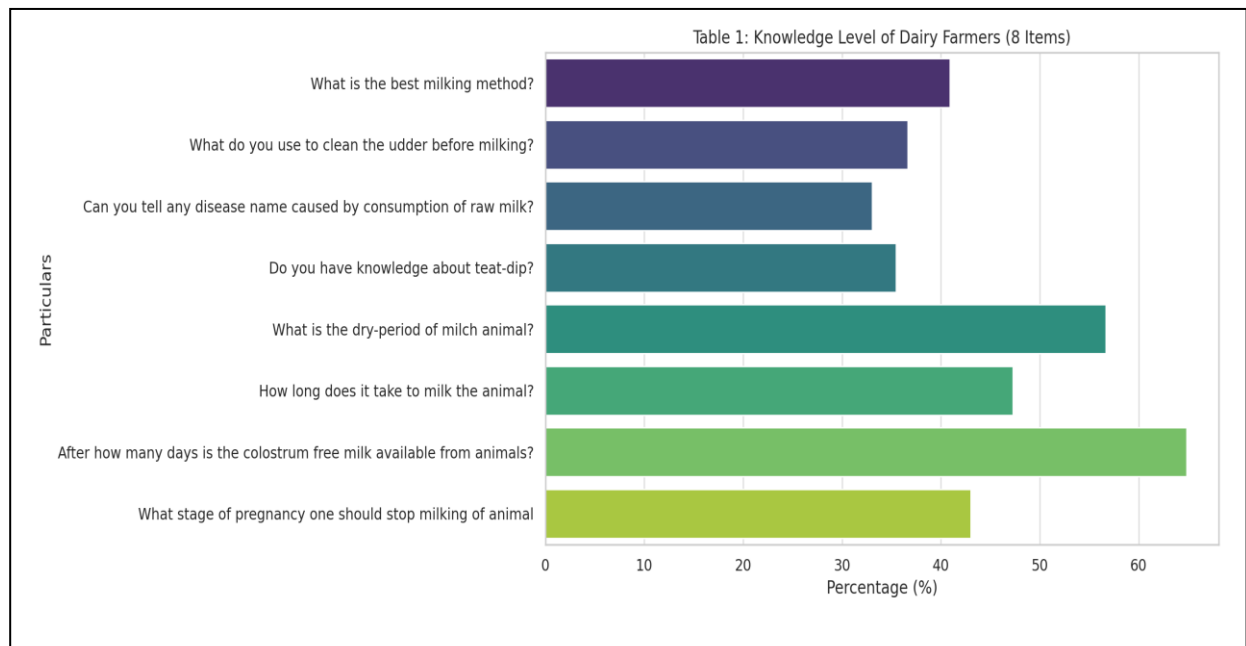
Result and Discussion

Knowledge in the present study was operationalized as a body of understood information possessed by the dairy farmers concerning good dairy farming practices which can be recalled through memory of ideas or content by the respondents at the time of the interview. The knowledge level of respondents regarding good dairy farming practices in the Central Plain zone of Uttar Pradesh was studied in this research, taking seven components namely- hygienic milking, animal breeding, animal feeding, animal health, animal welfare, environment, and socio-economic management practices.

Knowledge Level of Dairy Farmers on Hygienic Milking Practices

The first component is hygienic milking practices, figure 1 reported that the data in knowledge of the best milking method was 40.91 percent which shows that the farmers in this area did not know much about the different methods of milking and their beneficial effects. In the case of cleaning of udder before milking the knowledge level of the respondents was 36.67 percent because farmers did not know about any best method for udder cleaning. One-third (33.03%) of the respondents knew disease names caused by consumption of raw milk. 35.35 percent of respondents knew teat-dip, which is not a satisfactory indicator of hygienic milking practices. It is also observed that 56.67 percent of respondents had good knowledge about the dry period of the milch animal because farmers were concentrating on the lactation length of the animal, which indicates the milk yield from the animal.

Figure 1: Knowledge level of dairy farmers of good hygienic milking practices n=330



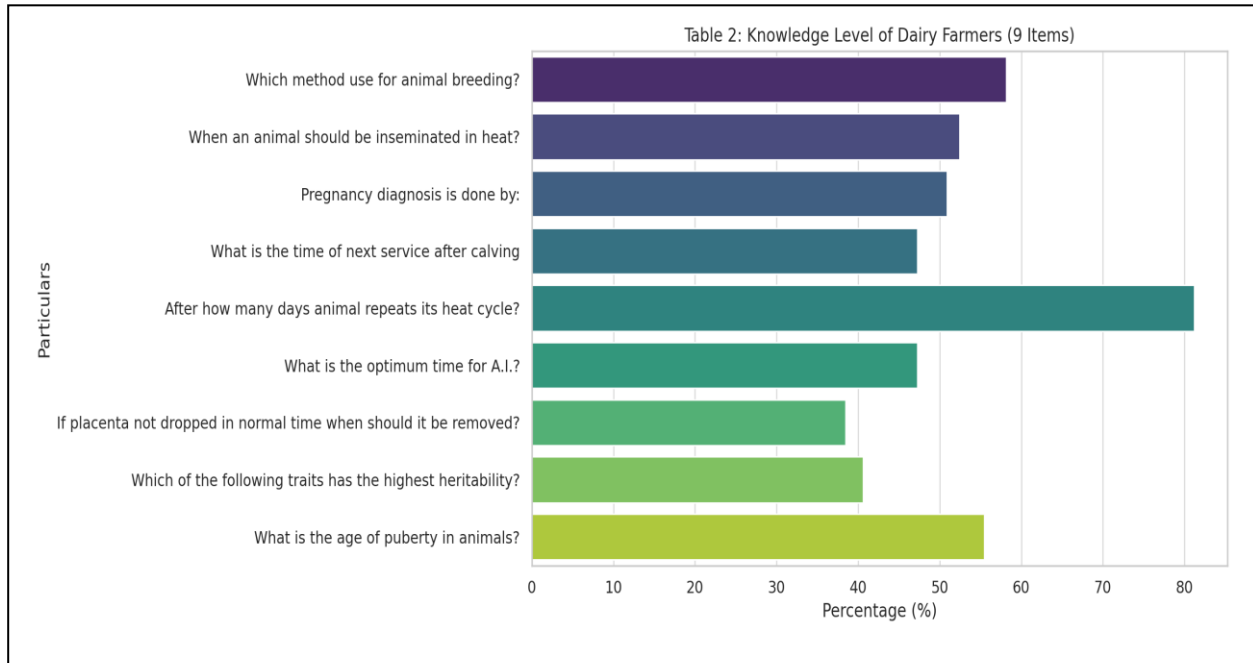
47.27 percent of respondents knew about the animal's lactation length, but the rest did not know how long it takes to milk the animal. 64.85 percent of respondents knew how many days the colostrum-free milk was available from the animal, and only 43.03 percent knew at what stage of pregnancy one should stop milking the animal.

Knowledge level of dairy farmers of good animal breeding practices

In the second component which is animal breeding practices, data represented in figure 2 revealed that the data in the knowledge of best method used for animal breeding were 58.18 percent of respondents which shows that the farmers in this area were knowledgeable about different methods of breeding and their beneficial effects. In case of insemination of the animal during heat the knowledge level of the respondents were slightly more than half (52.42%) because farmers know about symptoms of heat like ballowing, mounting on other animals, nudging and frequent urination but what is the right time of insemination was did not know. Around half (50.91%) of the respondents know about pregnancy diagnosis they explained that there was considered increase of the animal belly and pelvic region in the latter stage of pregnancy but rest of the respondents did not know. Slightly less than half (47.27%) of the respondents know about time of next service after calving and 81.21 percent of respondents know about animal going to repeat their heat cycle because the farmers expect milk yield from

animal in a very economical manner. What is the optimum time for A.I. knowledge level (47.27%) of respondents in the study area.

Figure 2: Knowledge level of dairy farmers of good animal breeding practices n=330



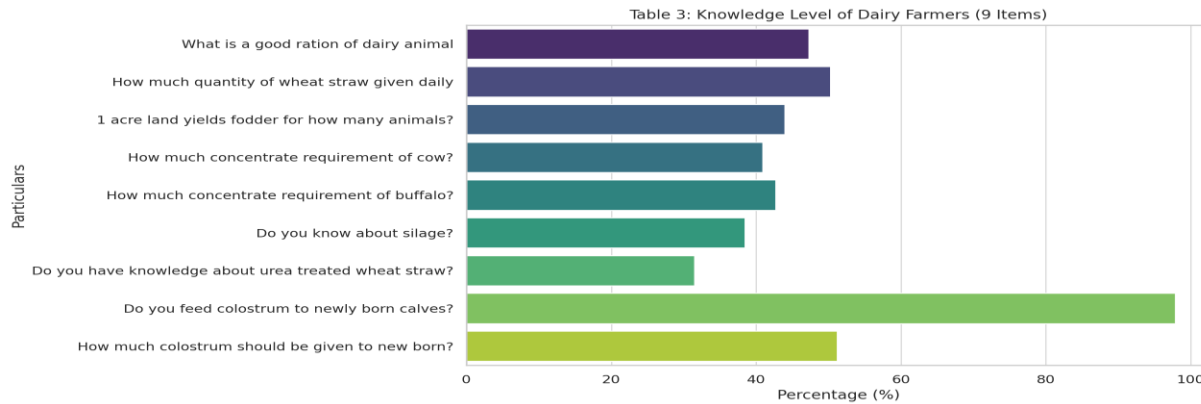
Only 38.48 per cent of the respondents well know about what is normal time of placenta drown because they did not know about any Veterinarian practices of the animal, generally, they called veterinary doctor and treatment done by him. 40.61 per cent of the respondents know about highest heritability of animal in the study area and 55.45 per cent of the respondents know about actual age of puberty of animal.

Knowledge level of dairy farmers of good animal feeding practices

In the third component that is animal feeding practices, figure 3 observed that the knowledge of good ration of dairy animal was 47.27 per cent because proper feeding of dairy cattle gives maximum returns from milk production. Half of (50.30%) of the respondents had knowledge of exact quantity of wheat straw given to animal per day. 43.94 per cent respondents had proper knowledge of yield of fodder per animal one acre because farmers grow seasonal fodder like barseem (rabi), sudan chari (zayad) and sorghum in kharif season. 40.91 per cent and 42.73 per cent of respondents had knowledge about how much concentrate requirement of cow and buffalo

because those farmers who sale their milk in cooperative society they got concentrate feed from the society.

Figure 3: Knowledge level of dairy farmers of good animal feeding practices n=330

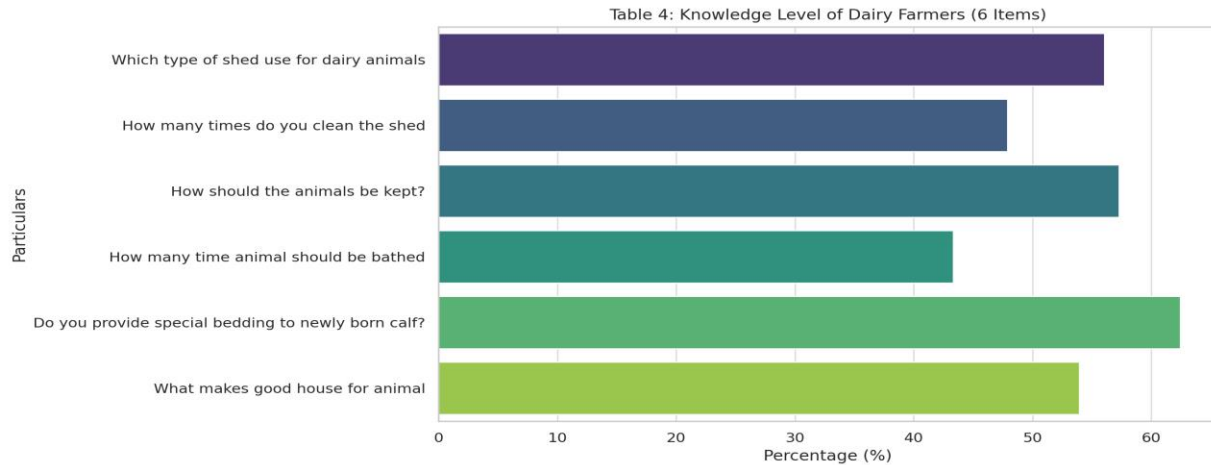


Only 3.33 per cent respondents had knowledge about silage and 31.52 per cent respondents had knowledge about urea treated wheat straw. majority (97.88%) of respondents had knowledge about colostrums feeding to newly born calves and 51.21 per cent respondents had knowledge about how much colostrums should be given to new born calves because farmers fed colostrums to new born calf and they know about importance of first milk produced by the mother after birth. colostrums have high nutrients and antibodies. From the feeding of colostrums to new born calf, the calf got protection from diseases and develop antibodies in body.

Knowledge level of dairy farmers of good animal welfare practices

Animal welfare refers to the quality of life experienced by an animal and encompasses how well the animal is coping with his or her current situation and surroundings. In the fourth component that is animal welfare practices, from the figure 4 it was observed that more than half (56.06%) of respondents had knowledge about which type of shed use for dairy animal. In the study area generally farmers used both kaccha and pakka shed for animal and it is protecting animal from adverse weather. 47.88 per cent respondents had knowledge about cleaning of shed because farmers know about so many diseases and their harmful effect.

Figure 4: Knowledge level of dairy farmers of good animal welfare practices n=330

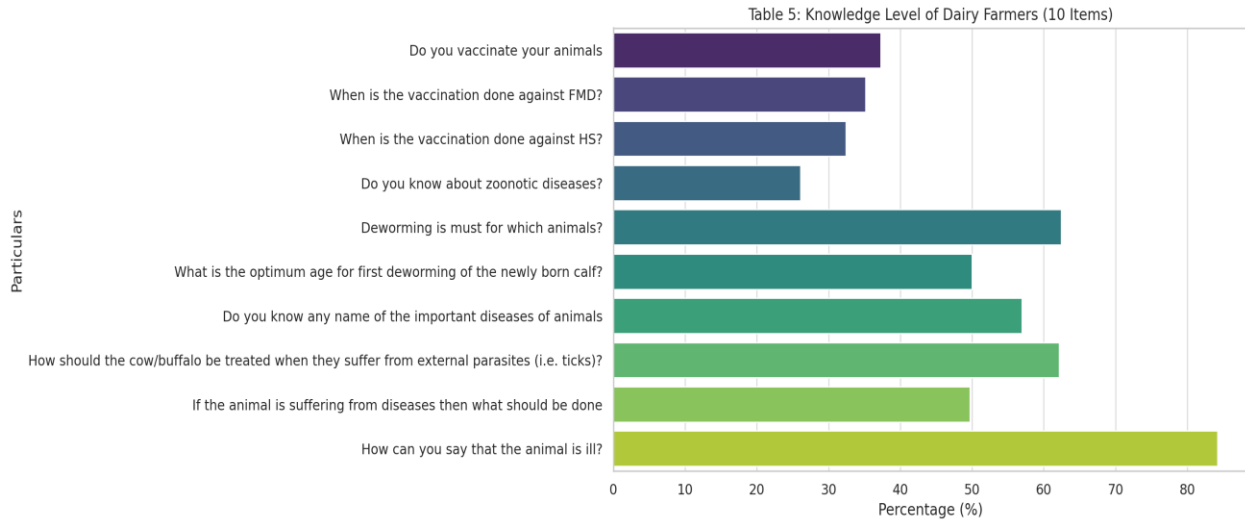


57.27 per cent respondents had knowledge about appropriate method of animal rearing. 43.33 per cent respondents had knowledge about how many times animal should be bathed and 62.42 per cent respondents had knowledge about special bedding to newly born calves because new born calve required extra care and management for better health growth. 53.94 per cent respondents had knowledge about good housing management in the study area.

Knowledge level of dairy farmers of good animal health practices

Monitoring animal health and preventing animal disease outbreaks is vital to the economy and safety of the country's food supply. Production of healthy livestock helps to ensure a safe food supply and keep consumer prices stable. In the fifth component that is animal health practices, it is evident from the figure 5 reported that 37.27 per cent respondents had knowledge about schedule vaccination because vaccinations of animal protect the animal from unwanted occurrence of disease. 35.15 per cent and 32.42 per cent respondents had knowledge about vaccination against FMD and HS.

Figure 5: Knowledge level of dairy farmers of good animal health practices n=330

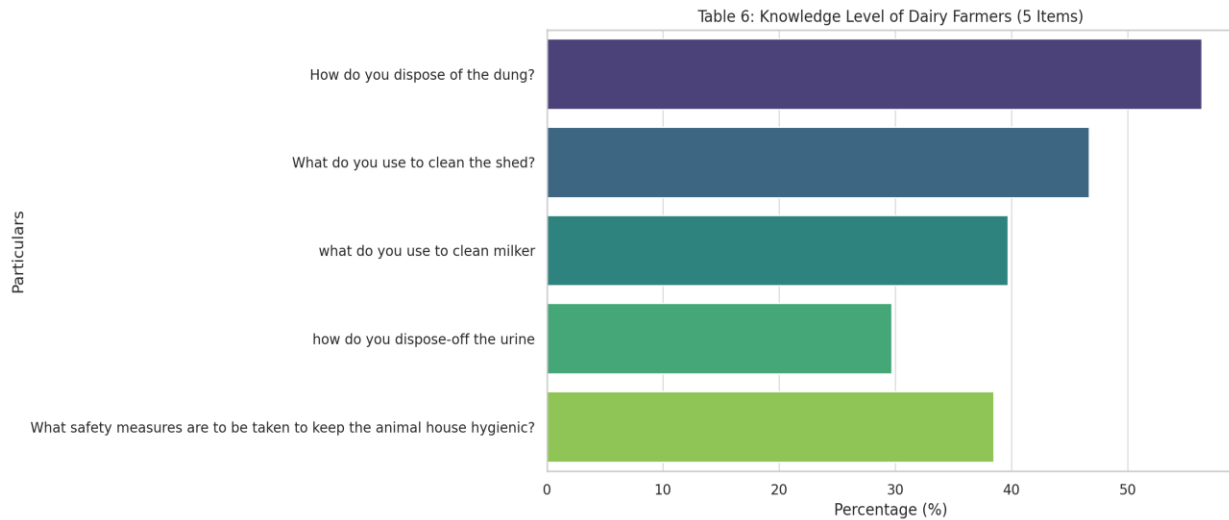


Only 26.06 per cent respondents had knowledge about zoonotic diseases which are spread by animal to human being. 62.42 per cent respondents had knowledge about scheduled deworming and it must for animal to control the internal and external parasite. Half (50.00%) of the respondents had knowledge about optimum age for first deworming of the newly born calves. Slightly more than half (56.97%) of respondents had knowledge about important diseases of animal. Farmers know about common disease which were frequently occurred in the study area. 62.12 per cent respondents know about control measure of external parasite. They used indigenous technological knowledge (Neem oil and castor oil) for internal parasite and chemical control (Albendazole and Fenbendazole) for external parasite. Slightly less than half (49.70%) of respondents had knowledge of handling of diseased animal and 84.24 per cent respondents had knowledge about ill animal because farmers observed by symptoms of sick animal like less feeding, reduce milk yield etc.

Knowledge level of dairy farmers of good environment practices

Uncomfortable environments affect the performance of dairy animals both directly and indirectly. It is decline in the milk yield, fertility, and growth rate. In the sixth component that is environment practices. According to data given in figure 6, reported that 56.36 per cent respondents had knowledge about proper disposal of dung. They used NADEF method for compost making and some farmers were used dung as a fuel purpose.

Figure 6: Knowledge level of dairy farmers of good environment practices n=330

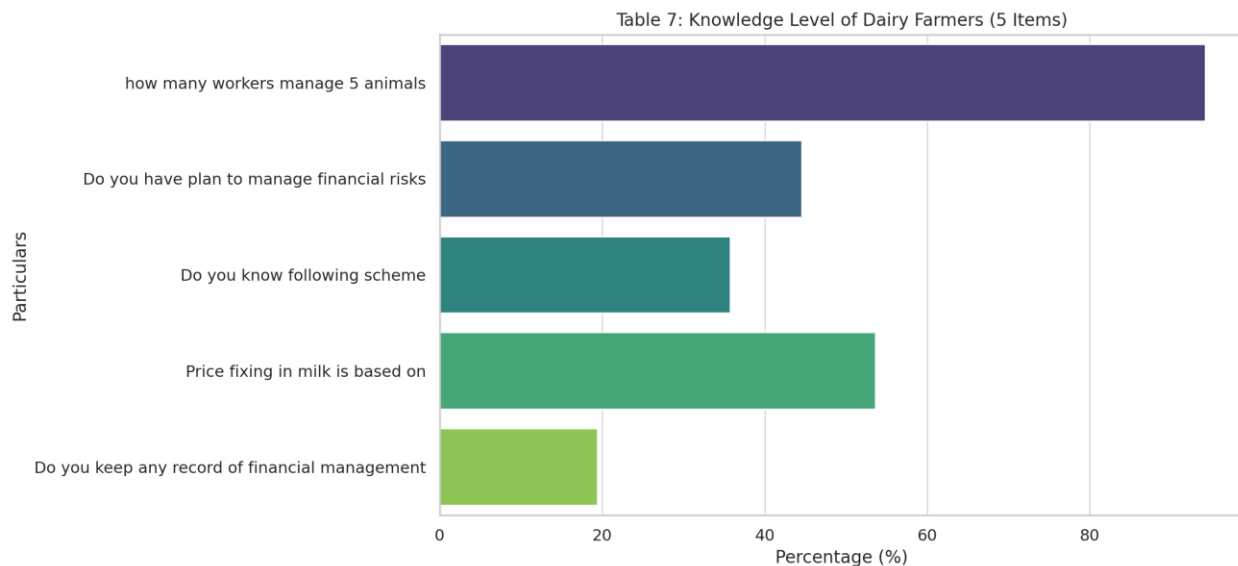


46.67 per cent respondents had knowledge about proper cleaning material of shed because the farmer's clean animal shed in two to three day interval. 39.70 per cent respondents know about proper cleaning of milker. 29.70 per cent respondents had knowledge about proper disposal of urine and 38.48 per cent respondents had knowledge about safety measure about animal hygienic housing.

Knowledge level of dairy farmers of good socio-economic management practices

In the seventh component that is socio-economic management practices. It is evident from the figure 7 reported that majority (94.24%) of respondents had knowledge about how many workers manage 5 animals in your farm. 44.55 per cent respondents know about financial management plan for risk management.

Figure 7: Knowledge level of dairy farmers of good socio-economic management practices n=330



35.76 per cent respondents know about government scheme running in their locality. 53.64 per cent respondents know about price fixing in based on fat and SNF content available in the milk. 19.39 per cent respondents had knowledge about record keeping.

Relative level of knowledge in different practices of good dairy farming

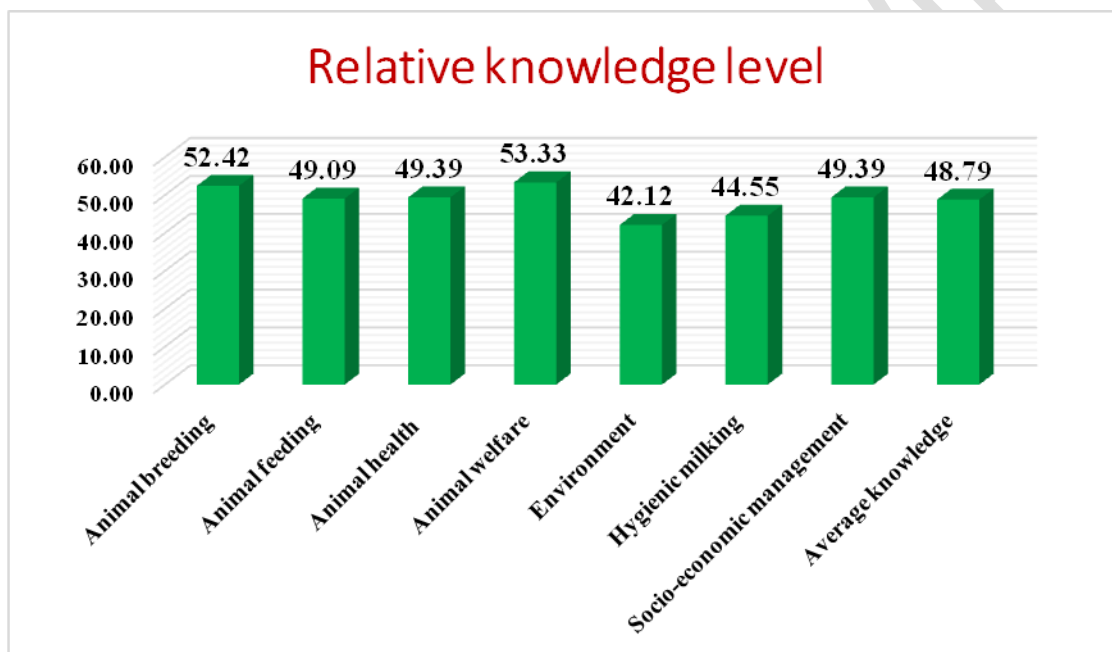
It was calculated by considering seven major components of good dairy farming practices, viz; animal welfare, animal breeding, animal nutrition, hygienic milking, animal health, environment and socio-economic management practices of animal.

Table 1: Relative level of knowledge in different practices of good dairy farming n=330

Sl. No.	Category	Frequency	percentage	Rank
1	Animal welfare	176	53.33	I
2	Animal breeding	173	52.42	II
3	Socio-economic management	163	49.39	III
4	Animal health	163	49.39	IV

5	Animal feeding	162	49.09	V
6	Hygienic milking	147	44.55	VI
7	Environment	139	42.12	VII
8	Average knowledge	48.79		

Figure 8.: Relative level of knowledge in different practices of good dairy farming



It was revealed from the table 1 and figure 8 there was 48.79 per cent respondents had overall knowledge about good dairy farming practices. Majority (53.33%) of the respondents had knowledge about good animal welfare practices, followed by 52.42, 49.39, 49.09, 44.55 and 42.12 per cent of respondents had knowledge about good animal breeding, socio-economic management, animal health, animal feeding, hygienic milking and environment practices, respectively.

Conclusion

The study revealed that dairy farmers had varying levels of knowledge across different components of good dairy farming practices. While farmers demonstrated relatively high knowledge in areas such as animal welfare, the heat cycle of dairy animals, and colostrum feeding to newborn calves, significant gaps were identified in critical areas like hygienic milking practices, proper vaccination schedules, and feeding techniques, such as silage preparation and the use of urea-treated wheat straw. To address these gaps, there is a clear need to strengthen extension services through targeted training programs that improve farmers' knowledge on these key practices. Additionally, the low awareness of government schemes suggests that better communication channels are needed to inform farmers about available financial and technical support, which can be achieved by working with local cooperatives and NGOs. Encouraging record-keeping and financial management is also crucial for enhancing farm efficiency and sustainability, and initiatives focusing on these aspects should be promoted through training programs to help farmers make informed decisions and manage risks more effectively. These policy interventions can significantly contribute to improving knowledge levels and the overall productivity of dairy farming.

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Reference

1. Rahman S, Gupta J. (2015) Knowledge and adoption level of improved dairy farming practices of SHG members and non -members in Kamrup district of Assam. India. *Indian Journal of Animal Research*, 49(2):234 -240.
2. Sabapara GP, Desai PM, Kharadi VB. (2013) Knowledge of dairy animal owners in improved dairy husbandry practices in tribal area of South Gujarat. *Asian Journal of Dairy and Food Research*. 32(4):332-334.
3. Deshmukh, G., & Pagar, A. (2014). Practice wise knowledge and adoption of clean milk production by dairy farm women in Junagadh district. *The Asian Journal of Animal Science*, 9 (2), 182–188.
4. Gill, S. S., & Singh, P. (1977). Professional knowledge of dairy farmers of Ludhiana district. *Indian journal of extension education*,13(3&4), 77-79.
5. Gunaseelan, M., Thilakar, P., Mathialagan, P., & Pandian, A. S. S. (2018). Knowledge level of Scientific dairy farming practices among peri-urban dairy farmers in Thanjavur district of Tamil Nadu. *Indian Veterinary Journal*, 95 (2), 14 – 18
6. India Tracker. (2023, September 14). *India records 58% increase in milk production since 2013-14; country accounts for 24% of global milk production*. India Tracker. <https://www.indiatracker.in/story/india-records-58-increase-in-milk-production-since-2013-14-country-accounts-for-24-global-milk-production>
7. Kumar, Y., & Prakash, C. (2017). Knowledge level of dairy farmers regarding clean milk production practices in field level in western UP. *Asian journal of animal sciences*, 12(1), 7-14.
8. Meena, M. L., & Sharma, N. K. (2007). Buffalo Keepers Knowledge about Improved Buffalo Production Practices. *Indian Journal of Animal Research*, 41(2), 121-125.
9. Nain, M. S., Singh, R., and Mishra, J. R. (2020) Relevance of good agricultural practices in organic production systems. *Journal of Community Mobilization and Sustainable Development*, 15(2). 306-314.

10. National Dairy Development Board (NDDB). (2023). *Dairy Farming in India: A Boon for Rural Livelihoods*. <https://www.nddb.coop/>
11. Kumar, S., Kumar, B., Hindustani, S., & Sankhala, G. (2011). Knowledge Level of Dairy Farmers in Operational Area of Krishi Vigyan Kendra about Improved Dairy Farming Practices. *Research Journal of Agricultural Sciences*, 2(1), 122-124.
12. Raj Lakshmi, Singh, A. K., and Shelar, R. (2023) Knowledge and Adoption of Good Management Practices among Litchi Farmers in Muzaffarpur District of Bihar. *Indian Journal of Extension Education*. 59(4), 130-134.
13. Singh, A. K., Saryam, M., Shah, R. and Ghatawal, J. P. (2018) Compare the Extent of Adoption of Good Dairy Farming Practices by the Dairy Farmers in Central Plain and Eastern Plain Zones of Uttar Pradesh. *Int. J. Pure App. Biosci.* 6 (1): 1383-1391
14. Sharma, R. K. (2015). *Dairy Farming: A Sustainable Livelihood Option for Small and Marginal Farmers*. *Indian Journal of Agricultural Economics*, 70(2), 189-204.