

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

Commented [WU1]: Reframe if needed

### 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.

Commented [WU2]: Add time frame of the study.

Commented [WU3]: Add points about the policy implication

**Keywords:** Animal, Dairy Farmers, 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. (NDDDB, 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.

Commented [WU4]: Add about research gap.

#### **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 1 lactating cow at the time of the study would be interviewed.

**Commented [WU5]:** Explain in detail about the sampling procedure.

**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 Level of Dairy Farmers on Hygienic Milking Practices**

Knowledge in the present study was operationalized as a body of understood information possessed by the dairy farmers with respect to good dairy farming practices which can be recalled through memory of ideas or content by the respondents at the time of interview. Knowledge level of respondents regarding good dairy farming practices in Central Plain zone of Uttar Pradesh were 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 of good hygienic milking practices**

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

**Table 1.: Knowledge level of dairy farmers of good hygienic milking practices n=330**

<b>Sl. No.</b>	<b>Particulars</b>	<b>Frequency</b>	<b>percentage</b>
----------------	--------------------	------------------	-------------------

1	What is the best milking method?	135	40.91
2	What do you use to clean the udder before milking?	121	36.67
3	Can you tell any disease name caused by consumption of raw milk?	109	33.03
4	Do you have knowledge about teat-dip?	117	35.45
5	What is the dry-period of milch animal?	187	56.67
6	How long does it take to milk the animal?	156	47.27
7	After how many days is the colostrum free milk available from animals?	214	64.85
8	What stage of pregnancy one should stop milking of animal	142	43.03

47.27 per cent respondents had knowledge about lactation length of the animal but rest of them did not know about how long it takes to milk the animal. 64.85 per cent of respondents had knowledge about after how many days is the colostrums free milk available from animal and only 43.03 per cent respondents know about what stage of pregnancy one should stop milking of animal.

#### **Knowledge level of dairy farmers of good animal breeding practices**

In the second component that is animal breeding practices, table 2 revealed that the data in knowledge of best method use for animal breeding were 58.18 per cent respondents which shows that the farmers in this area were know about different methods of breeding and its beneficial effect. In case of insemination of 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 right time of insemination were did not know. Around half (50.91%) of the respondents know about pregnancy diagnosis they explained that there was consideration 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 per cent

respondents know about animal going to repeat their heat cycle because the farmers expect milk yield from animal in very economical manner. What is the optimum time for A.I. knowledge level (47.27%) of respondents in the study area.

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

Sl. No.	Particulars	Frequency	percentage
1	Which method use for animal breeding?	192	58.18
2	When an animal should be inseminated in heat?	173	52.42
3	Pregnancy diagnosis is done by:	168	50.91
4	What is the time of next service after calving	156	47.27
5	After how many days animal repeats its heat cycle?	268	81.21
6	What is the optimum time for A.I.?	156	47.27
7	If placenta not dropped in normal time when should it be removed?	127	38.48
8	Which of the following traits has the highest heritability?	134	40.61
9	What is the age of puberty in animals?	183	55.45

Only 38.48 per cent of the respondents well know about what is normal time of placenta down 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, table 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.

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

Sl. No.	Particulars	Frequency	percentage
1	What is a good ration of dairy animal	156	47.27
2	How much quantity of wheat straw given daily	166	50.30
3	1 acre land yields fodder for how many animals?	145	43.94
4	How much concentrate requirement of cow?	135	40.91
5	How much concentrate requirement of buffalo?	141	42.73
6	Do you know about silage?	127	38.48
7	Do you have knowledge about urea treated wheat straw?	104	31.52
8	Do you feed colostrum to newly born calves?	323	97.88
9	How much colostrum should be given to new born?	169	51.21

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 calve 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 table 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.

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

Sl. No.	Particulars	Frequency	percentage
1	Which type of shed use for dairy animals	185	56.06
2	How many times do you clean the shed	158	47.88
3	How should the animals be kept?	189	57.27
4	How many time animal should be bathed	143	43.33
5	Do you provide special bedding to newly born calf?	206	62.42
6	What makes good house for animal	178	53.94

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 table 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.

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

Sl. No.	Particulars	Frequency	percentage
1	Do you vaccinate your animals	123	37.27
2	When is the vaccination done against FMD?	116	35.15
3	When is the vaccination done against HS?	107	32.42
4	Do you know about zoonotic diseases?	86	26.06
5	Deworming is must for which animals?	206	62.42
6	What is the optimum age for first deworming of the newly born calf?	165	50.00
7	Do you know any name of the important diseases of animals	188	56.97
8	How should the cow/buffalo be treated when they suffer from external parasites (i.e. ticks)?	205	62.12
9	If the animal is suffering from diseases then what should be done	164	49.70

10	How can you say that the animal is ill?	278	84.24
----	---	-----	-------

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 Felbendazole) 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.

Commented [WU6]: Check spelling

#### 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 table.6 reported that 56.36 per cent respondents had knowledge about proper disposal of dung. They used nadeef method for compost making and some farmers were used dung as a fuel purpose.

Commented [WU7]: Check spelling

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

Sl. No.	Particulars	Frequency	percentage
1	How do you dispose-off the dung?	186	56.36
2	What do you use to clean the shed?	154	46.67
3	what do you use to clean milker	131	39.70

4	how do you dispose-off the urine	98	29.70
5	What safety measures are to be taken to keep the animal house hygienic?	127	38.48

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 table 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.

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

Sl. No.	Particulars	Frequency	percentage
1	how many workers manage 5 animals	311	94.24
2	Do you have plan to manage financial risks	147	44.55
3	Do you know following scheme	118	35.76
4	Price fixing in milk is based on	177	53.64
5	Do you keep any record of financial management	64	19.39

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.

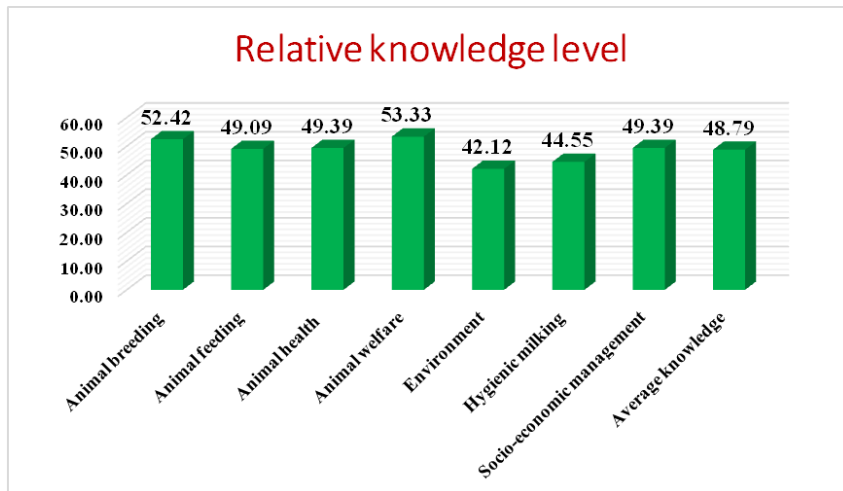
**Relative level of knowledge in different practices of good dairy farming**

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 8: 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	<b>Average knowledge</b>	<b>48.79</b>		

**Figure: 1.: Relative level of knowledge in different practices of good dairy farming**



It was revealed from the table 2.0 and figure 1.0 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

It indicated heterogeneous knowledge among dairy farmers for some of the components of good dairy farming practice. The areas of activities where knowledge was a little bit high include animal welfare, the heat cycle of dairy animals, colostrum feeding to newborn calves. However some of the critical areas in this area were very vacant especially in milking processes and vaccination. Key acts of feeding like handling of silage and use of urea-treated wheat straw were lacking. Thus, gaps 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. Record keeping and financial management must also encourage improvements in farm efficiency and sustainability, and training programs with

respect to these should encourage and promote initiatives for information on managing risks and informed decision-making. In general, knowledge-level enhancement and productivity in dairy farming can be significantly contributed by these policy interventions.

**Commented [WU8]:** Conclude the results and discussion.

UNDER PEER REVIEW

## Reference

- 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.
- 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.
- 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.
- Gill, S. S., & Singh, P. (1977). Professional knowledge of dairy farmers of Ludhiana district. *Indian journal of extension education*, 13(3&4), 77-79.
- 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
- 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>
- 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.
- Meena, M. L., & Sharma, N. K. (2007). Buffalo Keepers Knowledge about Improved Buffalo Production Practices. *Indian Journal of Animal Research*, 41(2), 121-125.

- 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.
- National Dairy Development Board (NDDB). (2023). *Dairy Farming in India: A Boon for Rural Livelihoods*. <https://www.nddb.coop/>
- 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.
- 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.
- 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
- Sharma, R. K. (2015). *Dairy Farming: A Sustainable Livelihood Option for Small and Marginal Farmers*. *Indian Journal of Agricultural Economics*, 70(2), 189-204.