Gaurav Singh
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Dr. Lokesh Gupta
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Deepak Singh
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Dheeraj Kumar
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Dashrath Singh Chundawat
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Assessment of the knowledge and adoption rates of enhanced animal husbandry practices among dairy farmers in Udaipur district of Rajasthan

Gaurav Singh, Dr. Lokesh Gupta, Deepak Singh, Dheeraj Kumar and Dashrath Singh Chundawat

Abstract
The study was conducted in Udaipur district, Rajasthan, involving four tehsils (Mavli, Vallabhnagar, Kotra, and Jhadol). From each tehsil, four villages were selected, and from each village, 10 respondents with a minimum of five dairy animals were randomly chosen, resulting in a total of 160 dairy farmers. Data collection was performed through structured interviews using a pre-tested questionnaire. Statistical analysis of the collected data utilized basic measures such as frequency, percentage, mean, and standard deviation. The results showed that 76.25% of Non-Tribal and 78.75% of Tribal respondents possessed a medium level of knowledge. Non-Tribal farmers demonstrated a higher level of knowledge in breeding practices, specifically artificial insemination (AI) at 93.75 MPS (Mean Percentage Score) and heat detection at 96.25 MPS, while both groups exhibited a lack of knowledge in pregnancy diagnosis. Regarding general management, both groups lacked understanding in aspects such as high-yielding fodder and separate housing. Adoption levels were classified as medium and high, with 67.50% and 31.25% for Non-Tribal farmers and 26.25% and 73.75% for Tribal farmers, representing low and medium adoption levels, respectively. The highest adoption levels were observed for AI at the time of heat, feeding colostrum to newborn calves, and providing permanent housing facilities. For health and hygiene practices, proper vaccination for dairy animals was highly adopted by Non-Tribal farmers, while grooming dairy animals was the most adopted practice in Tribal areas.

Keywords: Udaipur dairy farmers, mean percent score, knowledge level, adoption level

Introduction

Dairy farming holds a pivotal role in our nation's economy, contributing to increased food production, employment generation, and improved nutritional standards. The Indian dairy industry is amongst the largest and fastest-growing sectors. Dairy farming serves as a multifaceted solution to several agricultural challenges and also serves as an effective tool for enhancing the knowledge and adoption levels of dairy farmers.

During the 2021-22 period, the total milk production in India reached 221.06 million tonnes, exhibiting an annual growth rate of 5.29%. The top five milk-producing states were Rajasthan (15.05%), Uttar Pradesh (14.93%), Madhya Pradesh (8.06%), Gujarat (7.56%), and Andhra Pradesh (6.97%). The per-capita milk availability in 2021-22 stood at 444 grams per day, marking a 17-gram increase from the previous year. In the year 2020-21, the livestock sector's share at constant prices in the agricultural sector and the overall Gross Value Added (GVA) was 30.13% and 4.9%, respectively (Animal Husbandry Statistics - 2023, Government of India). According to the 20th livestock census, India had a total livestock population of over 535.78 million in 2019. Cattle constituted a significant portion of this population, with 192.49 million individuals, contributing to approximately 35.94% of the total livestock. Buffaloes accounted for 109.85 million, making up 20.45% of the livestock population. Among various livestock products, milk held the largest share, comprising 67.20% of the livestock sector in 2017. Despite the prominence of the dairy sector, many rural dairy farmers do not adhere to scientifically and modern animal husbandry practices, which have been developed through extensive research efforts by scientists over the course of decades. Therefore, there is an immediate need to create awareness among dairy farmers about modern technologies and scientific advancements in dairy production to enhance milk yield and quality.

Corresponding Author:
Gaurav Singh
Department of Animal Production, RCA, MPUAT, Udaipur, Rajasthan, India

Recognizing the aforementioned challenges, this present study was initiated with specific objectives to assess the knowledge of dairy farmers regarding recommended improved animal husbandry practices. Consequently, this study aimed to investigate the knowledge and adoption levels of improved animal husbandry practices in both Tribal and Non-Tribal areas of Udaipur district.

Materials and Methods
The study was conducted in the Udaipur district of Rajasthan. Four tehsils of the district were under study, in which two tehsils were selected from Tribal group namely Kotra and Jhadol, while other two were from Non-Tribal group namely Mavli and Vallabhnagar. The tehsils were selected on the basis of highest dairy animal's population. Four villages were selected from each tehsil and from each village 10 respondents who possess minimum five dairy animals were selected randomly. The data was collected from 160 dairy farmers with the help of a well- structured pre-tested interview schedule by personal interview. The collected data were analyzed by using simple statistical methods like frequency, percentage, mean, standard deviation as follows:

Percentage and frequency
This approach involved determining the percentage and frequency distribution of dairy farmers, allowing for the categorization of dairy farmers concerning their personal characteristics and independent variables.

Mean score
It was obtained by dividing total score of each statement by total number of respondents.

$$\text{Mean score} = \frac{\text{Total score of each statement}}{\text{Total number of respondents}}$$

Mean percentage score (MPS)
It was calculated by multiplying total obtained score of the respondents by 100 and divided by the maximum obtainable score.

$$\text{MPS} = \frac{\text{Total score obtained by the respondent}}{\text{Maximum obtainable scores}} \times 100$$

Rank
Ranks were assigned in descending order according to the Mean Percentage Scores obtained. This ranking approach allowed for a more comprehensive understanding of all items related to the questions under consideration.

Standard deviation
Mean and standard deviation were used for categorizing the respondent into different categories and to find out the variability of the dependent and independent variable involved in the study.

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

S = Standard deviation, n = Sample size
∑Xi = Sum of total scores in sample

∑Xi² = Sum of squares of score of each respondent in sample

Results and Discussion
This section of the chapter is focused on assessing the knowledge and adoption levels of dairy farmers in relation to improved animal husbandry practices. To gauge the extent of their knowledge and adoption of these practices, we devised a three-point continuum scale. Responses from the farmers were recorded on this scale, which consisted of three categories: "full adoption/full knowledge," "partial adoption," and "no adoption/no knowledge," each assigned scores of 2, 1, and 0, respectively. The findings within this section are organized into the following categories: breeding, feeding, housing and management, marketing, and health care. We then calculated the Mean Percentage Score for each category and ranked the results accordingly. This method allowed us to quantitatively assess the dairy farmers' familiarity with and implementation of improved animal husbandry practices.

Knowledge and adoption level of improved dairy husbandry practices
Knowledge level of improved dairy husbandry practices
This section of the chapter delves into the current state of knowledge among respondents from both Non-Tribal and Tribal areas regarding enhanced dairy animal husbandry practices. We assessed the respondents' knowledge by posing a series of questions concerning various facets of improved dairy animal husbandry practices. The results within this section are categorized and presented under the following topics

Knowledge level of farmers about breeding practices
The overall results reveal that Non-Tribal farmers demonstrated a higher level of knowledge concerning breeding practices in comparison to Tribal farmers. They exhibited a more comprehensive understanding of critical aspects such as the significance of artificial insemination, recognition of heat detection signs, common reproductive issues, and the age at which animals experience their initial heat cycle. However, it's noteworthy that both Non-Tribal and Tribal farmers displayed limited knowledge when it came to diagnosing pregnancy in dairy animals. This observation aligns with the findings of a study conducted by Singh et al. in 2020 [14], which reported that a majority of farmers (59%) possessed full knowledge about artificial insemination, while 24% had no knowledge, and 17% had partial knowledge. Furthermore, the majority of respondents in their study had only partial knowledge about pregnancy diagnosis, consistent with the present findings. A similar concurrence with our results was also noted in a study by Aulakh et al. in 2011 [4]. Additionally, Kavithaa et al. (2020) [17] reported findings that parallel our observations regarding breeding practices. In their study, approximately 91.67% of respondents possessed knowledge of heat symptom recognition, while 83.33% understood the appropriate timing for artificial insemination or service, and 80.00% recognized the importance of artificial insemination. Knowledge levels regarding reproductive problems, the age at which animals experience their initial heat cycle, and the optimal timing for insemination following regular calving stood at 68.33%, 60.00%, and 51.67%, respectively.

Table 1: Knowledge level of farmers about breeding practices

S. No.	Breeding	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Importance of artificial insemination	93.75	III	76.25	I	85.00	I
2.	Signs of heat detection	96.25	I	68.75	III	82.50	II
3.	Common reproductive problems in dairy animals	82.50	IV	72.50	II	77.50	IV
4.	Age of the animal at first heat	95.00	II	62.50	IV	78.75	III
5.	Pregnancy diagnosis in dairy animals	16.25	V	15.00	V	15.63	V

MPS= Mean Percentage Score, n=Total no. of respondents

Knowledge level about general management
The Overall results reveal that both Non-Tribal and Tribal farmers exhibited a relatively strong understanding of specific aspects of dairy animal husbandry practices. Notably, they demonstrated good knowledge regarding the practice of feeding colostrum to newly born calves and identifying suitable housing for semi-arid regions. Additionally, they displayed a reasonable comprehension of the utilization of mineral mixtures to enhance milk yield and quality. However, their knowledge levels were relatively lower concerning other practices, such as adhering to recommended concentrate allowances for lactating animals, identifying high-yielding varieties of fodder, and appropriately housing different categories of animals separately. These findings align with the conclusions drawn by Akhter *et al*. in 2013 [3]. Their research indicated that a majority of respondents in Jaipur district had a high to moderate level of knowledge regarding colostrum feeding (93.3%), feeding concentrates during lactation (77.8%), and the use of mineral mixtures (60.00%).

Furthermore, Kavithaa *et al.* (2020) [17] reported that approximately 71.67% of respondents possessed knowledge about high-yielding varieties of fodder in Tamil Nadu. In a similar vein, Patil *et al.* (2009) [11] found that a significant portion of their respondents (78.67%) lacked awareness regarding the necessity of separately housing dairy animals. This gap in knowledge could be attributed to a lack of technical information concerning the importance of proper animal housing.

Table 2: Knowledge level of farmers about general management practices

S. No.	General management practices (Feeding practices and Housing practices)	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	High yielding varieties of fodder in your area	45.00	VI	41.25	V	43.13	V
2.	Use of mineral mixture improves milk yield and quality	67.50	III	66.25	III	66.88	III
3.	Feeding colostrum to newly born calves provides disease resistance and energy rich food?	100.00	I	97.50	I	98.75	I
4.	Recommended concentrate allowance fed to lactating animals	51.25	IV	50.00	IV	50.63	IV
5.	Different category of animals should be housed in a separate pen	47.50	V	28.75	VI	38.13	VI
6.	The type of houses most appropriate for semi- arid areas	86.25	II	83.75	II	85.00	II

MPS= Mean Percentage Score, n= Total no. of respondents

Knowledge level about health and hygiene practices
In a comprehensive assessment, it was observed that both Non-Tribal and Tribal farmers exhibited relatively robust knowledge concerning certain aspects of animal husbandry practices. Notably, they demonstrated sound knowledge regarding the practices of deworming, aimed at eliminating intestinal parasites, and adhering to a proper vaccination schedule for disease prevention. They also displayed a reasonable understanding of the symptoms of metabolic disorders like mastitis. However, their knowledge levels were comparatively lower for other practices, including methods of disinfecting and cleaning cattle sheds, the control of ectoparasites in animal housing, the isolation of sick animals, and the recognition of symptoms associated with foot and mouth disease.

These findings are supported by the results of the study conducted by Akhter *et al.* (2013) [3], which concluded that a majority of respondents had good knowledge levels in deworming practices (91.1%), vaccination schedules (63.3%), and the identification of symptoms related to mastitis (56.7%). However, they also reported a lower level of awareness concerning disinfection and cleaning methods for cattle sheds (46.7%), ectoparasite control (28.9%), isolation of sick animals (26.7%), and symptoms associated with foot and mouth disease (21.1%). The data indicates a variability in knowledge levels among these practices, highlighting areas where targeted education and support may be needed to improve the overall understanding and implementation of effective animal husbandry practices among both Non-Tribal and Tribal farmers.

Table 3: Knowledge level of farmers about health and hygiene practices

S. No.	Health and Hygiene practices	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Isolation of sick animals prevent disease	55.00	VI	53.75	VI	54.38	VI
2.	Symptoms of Foot and mouth disease	47.50	VII	46.25	VII	46.88	VII
3.	Methods of disinfecting and cleaning the cattle shed	68.75	V	67.50	V	68.13	V
4.	Proper vaccination schedule prevent disease	83.75	II	82.50	I	83.13	II
5.	Deworming eliminates intestinal parasites	93.75	I	75.00	III	84.38	I
6.	Control ectoparasites in the animal shed	72.50	IV	71.25	IV	71.88	IV
7.	Symptoms of metabolic disorder like mastitis	77.50	III	76.25	II	76.88	III

MPS= Mean Percentage Score, n= Total no. of respondents

Knowledge level about clean milk production
The overall findings underscore that farmers exhibited a commendable level of knowledge regarding the maintenance of hygienic conditions within the dairy barn and the importance of maintaining cleanliness in the milking shed. However, there is a notable scope for improvement in their understanding of the correct method for milking and the practice of avoiding the initial streams of milk from each teat. Augmenting knowledge in these areas holds the potential to enhance overall practices and promote cleaner milk production.

These observations align with the findings reported by Kavithaa *et al*. in 2020 [17], who explored the knowledge domain of clean milk production. Their study revealed that nearly all (96.67%) of the respondents possessed knowledge concerning the significance of washing the udder before milking, followed by an understanding of the importance of

maintaining shed cleanliness (80.00%). Additional practices recognized by the respondents included cleaning utensils with boiled water or detergent prior to milking (68.33%) and understanding the importance of a dry period for clean milk production (61.67%). However, knowledge regarding the correct method of milking and the practice of avoiding the initial streams of milk from each teat while milking were possessed by 58.33% and 53.33% of the respondents, respectively. Furthermore, it is worth noting that dairy farmers cited reasons for not adopting the full hand method of milking, attributing their reluctance to the habitual use of the knuckling milking method. Additionally, some farmers believed that changing their milking method would result in reduced milk yield. These insights emphasize the need for educational initiatives and interventions to improve knowledge and encourage the adoption of better milking practices in dairy farming.

Table 4: Knowledge level of farmers about clean milk production

S. No.	Clean Milk Production	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Washing the udder, cleaning of hands before milking, cleaning the utensils with boiled water maintains hygienic condition in the dairy barn	96.25	I	67.50	I	81.88	I
2.	Right method for milking	15.00	IV	13.75	IV	14.38	IV
3.	First few streams of milk from each teat are avoided	27.50	III	26.25	III	26.88	III
4.	Cleanliness of milking shed reduce incidence of mastitis and ectoparasites in dairy animals	86.25	II	66.25	II	76.25	II

MPS= Mean Percentage Score, n= Total no. of respondents

Adoption level of improved dairy husbandry practices
This section of the chapter pertains to the prevailing level of adoption among respondents from both Non-Tribal and Tribal areas regarding improved animal husbandry practices. Adoption, in this context, refers to the conscious decision to fully embrace an innovation as the most advantageous course of action available. The results within this section have been organized and presented under the following categories, for a more comprehensive examination of the data.

Adoption level of farmers about breeding practices
When considering both Non-Tribal and Tribal farmers, the highest adoption level was observed in the practice of artificial insemination (A.I.) at the time of heat, with a Mean Percentage Score (MPS) of 55.63, ranking as the most widely adopted practice. This indicates that both Non-Tribal and Tribal farmers exhibited a relatively strong adoption of breeding practices. Adoption levels for maintaining

improved breeds of animals and conducting pregnancy diagnosis in dairy animals were relatively lower, with MPS values of 43.13 and 40.31, respectively, ranking second and third. Seeking assistance from veterinary hospitals for animal breeding displayed the lowest adoption level overall, with an MPS of 30.00, ranking fourth. These findings are in line with the results reported by Divekar *et al.* in 2020 [6]. Their study revealed that A.I. and the treatment of reproductive diseases by veterinarians were practices adopted by more than 95% of dairy farmers. About 75% of dairy farmers opted for pregnancy diagnosis of their animals between 60 to 90 days of service. Consequently, it can be inferred that the rearing of crossbred and superior milch animals and the utilization of veterinary hospitals for animal breeding were relatively less adopted practices. This could be attributed to farmers' lack of awareness regarding the importance of improved mulch animals and the benefits of animal breeding in a hospital setting.

Table 5: Adoption level of farmers about breeding practices

S. No.	Breeding	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Take help of veterinary hospitals for animal breeding?	31.88	IV	28.13	IV	30.00	IV
2.	Practice A.I. at the time of heat?	61.25	I	50.00	I	55.63	I
3.	Pregnancy diagnosis of dairy animals?	43.13	III	37.50	III	40.31	III
4.	Maintain improved breeds of animals?	45.00	II	41.25	II	43.13	II

MPS= Mean Percentage Score, n=Total no. of respondents

Adoption level of farmers about feeding practices
In an overarching evaluation, both Non-Tribal and Tribal farmers demonstrated relatively strong adoption levels in certain improved practices, such as the feeding of colostrum to dairy animals and ensuring the availability of clean water. Nevertheless, there exists a notable room for improvement in practices like adhering to the recommended quantity of concentrate mixture, the chaffing of green or dry fodder, and

ensuring the appropriate feeding of concentrates to pregnant animals.

These observations align with findings reported by Meena *et al*. in 2012 [10], who disclosed that the practices of feeding chaffed fodder and providing extra feed doses to animals were not adopted by any farmer in the Udaipur district. This could be attributed to a lack of awareness regarding the

importance of supplementing extra feed and utilizing chaffed fodder.

Similarly, Rawal *et al.* in 2017 [12] reported higher levels of adoption in the practice of colostrum feeding to newly born calves. Farmers, particularly women, were well-informed about the benefits of colostrum feeding for newborn calves, as it aids in antibody development and provides a laxative effect. While they adhered to concentrate feeding recommendations, less emphasis was placed on the preparation of hay and silage. These findings underscore the need for educational initiatives to enhance knowledge and foster the adoption of these essential practices, particularly among both Non-Tribal and Tribal farmers.

Table 6: Adoption level of farmers about feeding practices

S. No.	Feeding Practices	Non-Tribal (n₁=80)		Tribal (n₂=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Feed extra quantity of concentrate to pregnant animals?	86.25	IV	50.00	VI	68.13	VI
2.	Use mangers for animal feeding?	95.00	III	70.00	III	82.50	III
3.	Feed recommended quantity of concentrate mixture to dairy animals?	80.00	VI	63.75	IV	71.88	V
4.	Feed mineral mixture/common salt to dairy animals?	76.25	VII	45.00	VII	60.63	VII
5.	Feed colostrum's to a newly born calf within 1-2 hours of birth?	97.50	I	96.25	I	96.88	I
6.	Provide clean water to the dairy animals for required number of time?	96.25	II	95.00	II	95.63	II
7.	Chaff green/dry fodder?	51.25	VIII	20.00	VIII	35.63	VIII
8.	Feed green fodder in optimum quantity throughout the year to dairy animals?	83.12	V	61.25	V	72.19	IV

MPS= Mean Percentage Score, n= Total no. of respondents

Adoption level of farmers about housing practices
The adoption of improved housing practices among farmers exhibited variations between Non-Tribal and Tribal respondents. Non-Tribal farmers, in general, displayed higher adoption rates across several dimensions, including the utilization of proper drainage systems and floor slope, considerations in cattle housing design, the provision of permanent sheds for dairy animals, and ensuring adequate floor space. In contrast, Tribal farmers generally had lower adoption levels across most housing practices. Both groups displayed room for improvement, particularly in the practice of housing different categories of animals in separate sheds. Nevertheless, the provision of permanent sheds and the allocation of proper floor space were relatively better adopted practices among both Non-Tribal and Tribal farmers.

These findings are consistent with those reported by Sabapara *et al.* in 2015 [13], who assessed the adoption of various housing practices. Their study ranked the practices of keeping cows in the shed at night and outside during the day in winter and vice-versa in summer, housing in a separate located shed, providing proper floor space, loose housing with seasonal modification, provision of manger with optimum dimensions, proper orientation of cattle shed, proper height and ventilation, proper drainage and floor slope, providing bedding material on the floor in the winter season, and the provision of pucca paved floor in the shed. These practices were ranked as I to X, respectively, with Mean Percentage Scores (MPS) ranging from 97.5 to 7.50, indicating the varying levels of adoption of these housing practices among farmers.

Table 7: Adoption level of farmers about housing practices

S. No.	Housing	Non-Tribal (n₁=80)		Tribal (n₂=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Use of proper drainage system and slope of floor	63.75	III	40.00	IV	51.88	IV
2.	Housing different category of animals in a separate shed	23.75	V	17.50	V	20.63	V
3.	Design and management consideration for ideal cattle housing	57.50	IV	47.50	III	52.50	III
4.	Provision for pucca shed for dairy animals	73.75	I	55.00	II	64.38	I
5.	Providing proper floor space	67.50	II	57.50	I	62.50	II

MPS= Mean Percentage Score, n=Total no. of respondents

Adoption level of farmers about health and hygiene practices: Overall, In a comprehensive assessment, both Non-Tribal and Tribal farmers exhibited relatively robust adoption levels in certain health and hygiene practices, such as the vaccination of dairy animals against diseases and practicing grooming. However, there is a noticeable opportunity for improvement in practices such as isolating diseased animals, implementing control measures for external parasites, and ensuring the effective cleaning and disinfection of animal sheds. To enhance the adoption of these health and hygiene practices among farmers, it is crucial to raise awareness, provide training, and ensure access to veterinary services. This would contribute to better overall animal health and well-being.

These findings align with those reported by Divekar *et al.* in 2020 [6], which indicated that a higher number of dairy farmers had adopted vaccination as a preventive measure against infectious diseases such as Hemorrhagic Septicemia

(HS), Foot and Mouth Disease (FMD), and Brucellosis. Furthermore, Sabapara *et al.* in 2015 [13] revealed that the overall adoption of health care practices was satisfactory, but there existed a significant gap in the adoption of specific practices, including the isolation of diseased animals, control of external parasites, and the method of cleaning animal sheds. These insights underscore the importance of addressing these gaps in knowledge and practices to ensure the health and well-being of dairy animals.

Adoption level of farmers about clean milk production
In a comprehensive evaluation, both Non-Tribal and Tribal farmers exhibited commendable adoption levels in certain practices, including the cleaning of hands and animal udders before milking, as well as the sterilization and disinfection of milking utensils. However, there exists an opportunity for enhancement in practices such as the adoption of the full hand method of milking, milking animals in a clean and

hygienic environment or separate housing, and maintaining records of milk production. Emphasizing the importance of these practices, providing training, and ensuring the availability of appropriate infrastructure can contribute to improved clean milk production and enhanced milk quality. These observations are consistent with the findings reported by Divekar *et al.* in 2020 [6], who noted higher adoption rates for washing udders and teats and cleaning the milker's hands before milking. In the present study, a notably low adoption rate was observed for practices like the full hand method of milking, post-milking dipping of teats, and

testing for mastitis detection. This is in line with the findings of Kumar in 2011, who reported a very low adoption rate (only 2.5%) for the full hand method of milking. Traditionally, for generations, farmers have favored the knuckling method of hand milking due to its swiftness and reduced muscle strain. The cost associated with teat dipping and mastitis testing seems to be a factor contributing to their lower adoption rates. These insights highlight the need for educational efforts and addressing cost-related barriers to promote the adoption of best practices in milk production.

Table 8: Adoption level of farmers about health and hygiene practices

S. No.	Health care and Hygiene	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Dairy animals vaccinated against the diseases like H.S., F.M.D., B.Q. etc.	88.12	I	65.00	II	76.56	II
2.	Isolate diseased animals?	41.25	V	28.75	V	35.00	V
3.	Practice control of external parasites?	75.62	IV	53.12	IV	64.38	IV
4.	Practice grooming of animals?	86.25	II	75.00	I	80.63	I
5.	Clean and disinfect the animal shed?	79.37	III	58.12	III	68.75	III

MPS= Mean Percentage Score, n= Total no. of respondents

Table 9: Adoption level of farmers about clean milk production

S. No.	Clean milk production	Non-Tribal (n_1=80)		Tribal (n_2=80)		Overall (n=160)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Practices full hand method of milking?	55.00	IV	45.00	IV	50.00	IV
2.	Clean hands and animals' udder before milking?	97.50	I	97.5	I	97.50	I
3.	Sterilize and disinfect the milking utensils?	95.00	II	68.75	II	81.88	II
4.	Milk the animals in a clean and hygienic place/separate house?	93.75	III	58.75	III	76.25	III
5.	Keep milk record?	53.75	V	40.00	V	46.88	V

MPS= Mean Percentage Score, n= Total no. of respondents

Conclusion
The study highlights notable disparities in the knowledge and adoption of dairy farming practices between Non-Tribal and Tribal farmers. Non-Tribal farmers exhibit a superior understanding, particularly in breeding practices, with a particular emphasis on artificial insemination. However, both groups display knowledge deficiencies in the realm of pregnancy diagnosis. In terms of general animal management, both Non-Tribal and Tribal farmers demonstrate competence in certain practices but exhibit shortcomings in understanding high-yielding fodder varieties and recommended concentrate allowances for lactating animals. Knowledge gaps are also evident in recognizing disease symptoms and implementing isolation practices for ailing animals.

Within the domain of clean milk production, both groups exhibit sound understanding, emphasizing the significance of maintaining hygiene during the milking process. Nevertheless, knowledge deficiencies persist in the precise method of milking. Concerning adoption levels, the majority of respondents in both Non-Tribal and Tribal areas demonstrate a moderate level of adoption of improved animal husbandry practices. The highest adoption levels vary across practices. In breeding practices, both groups exhibit the highest adoption level in artificial insemination at the time of heat. In feeding practices, the highest adoption levels pertain to feeding colostrum and ensuring the provision of clean water. Health and hygiene practices, such as vaccination and cleanliness, exhibit variable adoption levels but underscore the fundamental importance of maintaining hygienic conditions for clean milk production. In conclusion, there is a discernible imperative for targeted educational and capacity-building interventions to enhance the knowledge and adoption of best practices among both

Non-Tribal and Tribal dairy farmers. Bridging these knowledge gaps and encouraging the widespread adoption of improved animal husbandry practices will ultimately culminate in increased productivity and enhanced livestock health within both communities.

Acknowledgments

References
1. 20th Livestock census. Department of animal husbandry and dairying. Ministry of fisheries, animal husbandry and dairying, government of India, New Delhi; c2019.
2. Annual report, Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India; c2021-22.
3. Akhter J, Asiwal BL, Hussain A. Knowledge and adoption of animal husbandry practices among the farmers of Sikar district of Rajasthan. Indian Journal of Extension Education and Research Development. 2013;21(3):196-199.
4. Aulakh GS, Yadav JS, Singh R. Knowledge Level of Dairy Farmers Regarding Recommended Buffalo Management Practices. Journal of Dairying Foods and Home Sciences. 2011;30(2):147-149.
5. Chandankar V, Rathod T, Rathod MK, Jangwad NP. Knowledge and Adoption about dairy management practices of farmers in Wardha district. Agriculture Update. 2017;12(5):1822-1827.
6. Divekar BS, Trivedi MM. Adoption status of improved animal husbandry practices and its relationship with the profile of dairy farmers in Kheda district of Gujarat.

Indian Journal of Veterinary Science and Biotechnology. 2020;10(21):887.

7. Khode VN, Sudhakar P, Chauhan D. Adoption of improved Animal Husbandry practices by dairy Farmers. International Journal of Animal and Veterinary Sciences. 2017;4(1):01-05.

8. Kumar S, Kumar B, Hindustani S, Sankhala G. Knowledge level of dairy farmers in operational area of Krishi Vigyan Kendra about improved dairy farming practices. Research Journal of Agricultural Sciences. 2011;2(1):122-124.

9. Mali KN, Belli RB, Guleda GSS. A study on knowledge and adoption of dairy farmers about improved dairy management practices. Agriculture Update. 2014;9(3):391-395.

10. Meena GL, Tailor R, Sharma FL. Adoption of scientific dairy husbandry practices by Tribal farmers. Rajasthan Journal of Extension Education. 2012;20(2):121-124.

11. Patil AP, Gawande SH, Nande MP, Gobade MR. Assessment of knowledge level of dairy farmers in Nagpur district and the co-relation between socio-economic variables with their training needs. Veterinary World. 2009;2(5):199-201.

12. Rawal R, Rani S. A study on knowledge and adoption level of improved animal husbandry practices by farm women of Haryana. Current Journal of Applied Science and Technology. 2017;24(4):1-8.

13. Sabapara GP, Fulsoundar AB. Adoption level of improved dairy husbandry practices and constraints in rural areas of Surat district. Indian Journal of Animal Production and Management. 2015;31(3-4):1-5.

14. Singh B, Mahajani K, Meena KC. Knowledge of improved dairy husbandry practices of farmers of Kauroli, district of eastern Rajasthan. Journal of Agriculture and Ecology. 2020;9(5):48-54.

15. Singh S, Kumar R, Meena BS. Adoption level of scientific dairy farming Practices by dairy farmers of Haryana. Indian Research Journal of Extension Education. 2010;10(3):45-48.

16. Bose S, Jahanara DK, Dwivedi RK, Gupta D. Studies on adoption of improved dairy management practices by the women dairy farmers in Deoghar district of Jharkhand. International Journal of Advances in Agricultural Science and Technology. 2019;6(6):42-49.

17. Angelin J, Kavitha M. Exopolysaccharides from probiotic bacteria and their health potential. International Journal of Biological Macromolecules. 2020 Nov 1;162:853-65.