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Socio-economic Determinants of Dairy Farmers' Knowledge on Dairy Farming Practices in Uttar Pradesh, India

Saurabh Sharma[1], Herojit Singh[2] and Sabbithi Pavan[3]

ABSTRACT

The study was carried out among dairy farmers of Balamau block of Hardoi district of Uttar Pradesh to assess the socio-economic landscape and dairy farming practices. Utilizing a multistage purposive cum random sampling approach, data from 60 dairy farmers were collected and analyzed. Findings revealed diverse socio-economic backgrounds and educational levels among farmers, influencing their farming decisions. Buffalo predominated the livestock, with significant variations in milk production of cross breeds. Reproductive parameters underscored opportunities for improvement. Correlation and regression analyses elucidated education, training participation, social participation and scientific orientation as pivotal predictors of knowledge level in dairy management. Higher education and greater participation in training sessions were associated with better management practices. The study emphasizes the significance of education, continuous learning and scientific orientation in optimizing dairy farming practices and enhancing industry profitability offering valuable insights for stakeholders in the field. Regression analysis explained 62.10% of knowledge variation, emphasizing education, family type, training, social participation, and scientific orientation.

Keywords: *Dairy farming; Socioeconomic factors; Livestock diversity; Animal care methods; Calving timing; Cooperative milk enterprises; Uttar Pradesh*

INTRODUCTION

India, a prominent player in global milk production, represents roughly 20 per cent of the world's milk output. This sector has become a vital source of income for millions of rural households, particularly small-scale and landless farmers (Economic Times, 2015). In contrast, Hardoi district in eastern Uttar Pradesh faces distinct challenges due to lower rainfall compared to neighboring areas. This climate has led to reduced agricultural productivity, frequent crop failures, and diminished farmer incomes (Kochewad, 2017). However, dairy farming presents an opportunity for income diversification within local communities. Low milk production per animal in this region is primarily due to traditional farming practices and limited knowledge of modern dairy management techniques. Acquiring knowledge of improved practices is essential for boosting livestock production. Numerous studies across India stress the importance of adopting scientific dairy management to enhance productivity. Therefore,

[1]Department of Agricultural Extension Education, Nagaland University, SAS, Medziphema campus, (Nagaland), India.
[2]Department of Agricultural Economics, SAS, Nagaland University, Medzipnema campus (Nagaland), India.
[3]Department of Entomology, SAS, Nagaland University, Medzipnema campus (Nagaland), India.

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conducting surveys in rural areas is vital to assess the adoption of these practices. Understanding the current situation and promoting modern dairy management techniques can foster sustainable growth in the sector, improving the economic status of dairy farmers, not only in Hardoi but also in similar regions.

The present study aims to fill this knowledge gap by comprehensively assessing the socio-economic profile of dairy farmers, their knowledge of dairy management, the output and breeding status of dairy animals in Balamau block of Hardoi district. Our goal is to contribute to the gaps in knowledge on dairy farming practices among farmers so as to provide insights to policy formation and interventions for sustainable growth in the dairy sector. Ultimately our efforts aim to enhance the livelihoods of rural communities in this region and beyond.

METHODOLOGY

The present study conducted in the year 2022-23, aimed to analyze dairy farming practices among individuals owning more than four milch animals within selected villages of Balamau block, located in the Hardoi district of Uttar Pradesh, India. The study utilized an *ex-post facto* research design and employed a multistage purposive cum random sampling approach. To ensure representativeness, the study employed a stratified random sampling design. From the 19 blocks in the Hardoi district, Balamau block was purposively chosen as the focus area. From the selected block, six villages were randomly chosen, resulting in a total of six villages for the study. Within these villages, dairy farmers owning more than four or more milch animals constituted the sampling frame. Ten farmers were randomly selected from each village, totaling 60 units for data collection. Out of a total of 305 livestock, 80 were indigenous cows, 34 were mix-crossbred cows and 191 were the buffaloes. Data collection was conducted using a meticulously designed interview schedule, which underwent pilot testing to validate its efficacy. Feedback from the pilot study led to refinements in the interview schedule, particularly addressing confusing questions and optimizing the time and length of the interview. Personal interviews were conducted in the early morning to ensure accessibility and foster cooperation with the farmers, facilitating comprehensive data collection. The collected data underwent thorough analysis using various statistical tools, including frequency and percentage calculations, as well as correlation and multiple regression analysis, utilizing SPSS software. These analytical techniques enabled meaningful interpretation of the data, contributing to the study's overall value and significance. It highlighted the importance of factors such as breed selection, feeding practices, healthcare management and economic factors affecting dairy farmers' decision-making processes.

FINDINGS AND DISCUSSION

Socio-Economic Status of the Respondents

Table 1 offers valuable insights into the socio-economic characteristics of dairy farmers, shedding light on their demographic, educational and experiential profile as well as their land holding, housing conditions, diversified enterprises and income levels (Kumar et al. 2023). A significant portion, 56.67 per cent, belonged to the Other backward class category with 25.00 per cent in the general category, 16.67% among the Scheduled Caste (SC) and only 1.67% representing the Scheduled Tribe (ST) category. This distribution suggests a diverse representation of social categories among dairy farmers. The higher OBC representation suggest that this group tends to adopt dairy enterprise as a major earning resource than other groups (Vekariya et al. ,2016).

In education 48.33 per cent had primary education, while 33.33 per cent had graduate and

above educational qualifications. Additionally, 16.70 per cent completed secondary education and only 1.70 per cent were illiterate. These educational levels indicate a diverse range of educational backgrounds among dairy farmers. Farmers with higher education levels may be more inclined to adopt modern farming practices and innovations. To leverage this educational program tailored to the needs of illiterate and less-educated farmers can be designed to uplift the entire farming community. These findings are also aligned with that of Kochewad (2017).

About 66 per cent had a medium level of experience in dairy farming while 16.67% had low and high levels of experience respectively. Farmers with medium experience may exhibit a balance between traditional and modern practices. These findings also aligned with Khode et al. (2021). However, the relatively low percentage of highly experienced farmers suggests that the industry could benefit from knowledge transfer and mentoring programmes to ensure the sustainability of dairy farming practices. A similar trend was observed by Gangasagare et al., 2009 with 54.17 per cent. Pertaining to the farming lands 75.00 per cent of farmers had irrigated lands while 25.00 per cent had un-irrigated/rainfed lands. Access to irrigation can significantly impact crop and fodder production (Chapman et al. , 2008). Farmers with irrigated lands may have better fodder availability and consequently, higher milk production. Investment in irrigation infrastructure and water management could further enhance the productivity of dairy farms. About 65.00% lived in concrete roof houses 33.33% in tin roof houses and 1.67% in thatched roof houses. Housing conditions are indicative of overall well-being. Farmers with better housing may have higher socio-economic stability. Efforts to improve housing conditions for all farmers could contribute to enhanced living standards and well-being. Regarding occupational/entrepreneurial engagements over 50.00% were solely involved in dairy-related activities while 22.58% combined dairy with goatry 19.35% integrated dairy with poultry, 6.45% embraced dairy and mushroom farming and 1.61% ventured into Dairy + Poultry + mushroom. Farmers practicing mixed farming may have diversified income sources reducing risks associated with fluctuations in dairy prices. Encouraging such diversification and providing training in integrated farming practices could enhance resilience. These studies are also aligning with the research of Ahirwar et al. (2016). Financially, the majority (55.00%) fell into the medium-income group, followed by 35.00% in the low-income bracket, and a notable 10.00% in the high-income category. This complex economic spectrum among dairy farmers adds depth to the multifaceted nature of their livelihoods. Income levels may reflect access to markets, productivity, and resource availability. Strategies to increase income for low-income farmers, such as value addition and market linkages, could help improve their livelihoods.

Table 1: Dairy Farmers' Socio-Economic Status

Sl. No.	Characteristics	Frequency	Per centage
1	**Category**		
	General (OPEN)	15	25.00
	Other backward class (OBC)	34	56.67
	Scheduled tribe (ST)	1	1.67
	Scheduled caste (SC)	10	16.67

Sl. No.	Characteristics	Frequency	Per centage
2	**Educational status**		
	Illiterate	1	1.70
	Primary	29	48.33
	Secondary	10	16.70
	Graduate & above	20	33.33
3	**Experience in Dairy farming**		
	Low (up to 10 years)	10	16.67
	Medium (between 11 to 20 years)	40	66.67
	High (above 20 years)	10	16.67
4	**Type of land**		
	Irrigated	45	75.00
	Rainfed	15	25.00
5	**Household type**		
	Thatched roof and mud-brick walls	1	1.67
	Metal roof	20	33.33
	Cement concrete	39	65.00
6	**Enterprises performed along with dairy**		
	Dairy	31	50.00
	Dairy + Goatry	14	22.58
	Dairy + Mushroom	4	6.45
	Dairy + Poultry	12	19.35
	Dairy + Poultry + Mushroom	1	1.61
7.	**Annual income**		
	Low-income families (Up to Rs. 1,00,000)	21	35.00
	Middle income level families (Rs. 1,00,001 to 2,00,000)	33	55.00
	High income (Above Rs. 2,00,000)	6	10.00

Table 2 provides a comprehensive overview of the livestock population nurtured by dairy farmers shedding light on the types of animals, their production status, animal husbandry practices, average milk selling and milk production patterns. The data presented in this table offers valuable insights into the dynamics of dairy animal production in the surveyed area. Buffalo dominated the scene at 62.62 per cent closely followed by indigenous cows at 26.23 per cent and crossbred cows at 11.15%. The prevalence of buffalo in the dairy sector

suggests their suitability for milk production in the region (Mandi et al., 2022). To enhance dairy productivity initiatives to improve the genetic potential of indigenous and crossbreed cows may be beneficial. This could lead to an increase in the proportion of crossbreed cows over time this study is also aligning with World agriculture group (2009) findings. Regarding milking pregnant animals, they constituted a significant portion at 61.64%, followed by milking non-pregnant animals at 32.46%. The Dry and dry non pregnant animals made up only 3.93% and 1.97% of the heard respectively. The high percentage of milking pregnant animals indicates a focus on milk production, while the presence of dry animals suggests the need for better reproductive management. There is potential for increasing the efficiency of milk production by addressing reproductive health and nutrition in dry animals. The low adoption of practices like de-worming and mineral mixture feeding suggests opportunities for capacity building and awareness campaigns among dairy farmers. Increasing the adoption of these practices can contribute to healthier animals and higher milk yields (Gaur et al., ,2011) reported a higher rate of 88.67% for consistent vaccination, indicating the need for more awareness and education. Additionally, only 27.74% provided mineral mixture feed regularly to their dairy animals, suggesting room for improvement (Gadhavi et al., 2020). The survey also explored milk utilization patterns. A substantial 61.67% opted to sell their milk to co-operative dairies, while 23.33% sold to direct customers. Khoa making centers accounted for 11.67%, and government dairies attracted 3.33%. These diverse practices highlight the dynamic nature of the dairy industry, offering insights for further analysis and strategic planning. The preference for co-operative dairies by a majority of farmers may indicate trust in these institutions and possibly better remuneration. Expanding and strengthening co-operative dairies could further incentivize dairy farmers to enhance their milk production. The average daily milk production (kg) for 24 crossbred cows of the heard was 9.65 kg and 148 buffaloes of the heard was 6.50 kg, while for 40 indigenous cows of the heard was 3.01 kg. According to Singh, 2016 the average daily milk yield was 5.35 liters for crossbred cows and 3.29 liters for native animals. The significant difference in milk production between indigenous and crossbred cows highlights the potential for crossbreeding programmes to improve overall milk production. Efforts to promote crossbreeding while ensuring the well-being of indigenous breeds can be explored (Sharma et al. , 2013).

Table 2: Status of Dairy Animal Production

Sl. No.	Characteristics	Frequency	Percentage
1	**Dairy animal**		
	Indigenous cow	80	26.23
	Mix crossbred cow	34	11.15
	Buffalo	191	62.62
2	**Production status of dairy animal**		
	Milking non-pregnant	99	32.46
	Milking pregnant	188	61.64
	Dry pregnant	12	3.93
	Dry non-pregnant	06	1.97

Sl. No.	Characteristics	Frequency	Percentage
3	**Animal husbandry practices followed by the farmer**		
	Mineral mixture feeding	53	27.74
	De-worming	33	17.27
	Vaccination	205	54.97
4	**Selling pattern of milk**		
	Direct customer	14	23.33
	Co-operative dairy	37	61.67
	Government dairy	2	3.33
	Khoa making centre	7	11.67
5	**Average per day milk production (kg)**		
	Indigenous cow	3.01	-
	Crossbred cow	9.65	-
	Buffalo	6.50	-

Table 3. depicts the essential reproductive parameters like number of services per conception, age of first calving. The average age at first calving (AFC) for indigenous, crossbred cows was 48 months and 32 months respectively. The AFC for buffaloes was 36 months. The number of services per conception for indigenous and crossbred cows was 1.66 and 1.58 respectively and that for buffaloes was 1.68. The AFC has adverse effect on lactational milk yield. The AFC can be reduced with standard feeding practices. The reproductive parameters being less heritable, can be managed with standard managemental and husbandry practices. This highlights the need for acquiring knowledge about dairy management, underlining the importance of field training for dairy enterprise. The importance of dairy enterprise for farming community makes training an unavoidable part of the dairy enterprise.

Table 3: Dairy Animal Reproductive Characteristics

Dairy Animal Type	Indigenous cow		Crossbred cow		Buffalo	
	First calving age (months)	Number of services per conception	First calving age (months)	Number of services per conception	First calving age (months)	Number of services per conception
Values	48	1.66	32	1.58	36	1.68

The table also indicates the potentials for enhancing milk production, improving animal husbandry and health practices and optimizing marketing strategies to benefit the farmers. Only through collaborative efforts of stakeholders, policy makers and researchers, we can unlock the full potential of dairy sector to benefit the dairy farmers.

Table 4: Correlation between Independent Variables and Dependent Variable, Knowledge of Dairy Farmers N=60

Sl. No.	Independent Variables	Coefficient of Correlation Knowledge (r)
1.	Age	0.156 NS
2.	Education	0.446**
3	Experience in Agriculture	-0.356**
4.	Type of family	0.453**
5.	Socio-economic status	-0.126 NS
6.	No. of training attended	-0.346**
7.	Landholding (ha)	0.573**
8.	Social participation	-0.131 NS
9.	Scientific orientation	0.504**

*** P < 0.01 * P < 0.05 NS = non-significant*

Table 4 indicates that there is a negative but non-significant correlation (r = -0.156) between the age of dairy farmers and their knowledge level regarding management practices. The association between age and knowledge of dairy management practices was not found to be statistically significant. This aligns with the results reported by Arora, 2006 and Sharma et al., 2018. and we concur with their findings. Education is recognized as a pivotal factor in the success of any enterprise. In the current study, our findings reveal a positive and highly significant correlation (P < 0.01) between education and knowledge. Similar results were reported by Arora, 2006 and Fuerst waltl et al., 2018 substantiating the idea that education significantly influences the level of knowledge in the context of dairy management practices.

The current findings clarify that the experience in agriculture and the number of training sessions attended exhibit a negative but highly significant correlation with knowledge level of the dairy farmers. This suggests that the experience in agriculture and the attendance of training sessions play a crucial role in shaping the knowledge level of dairy farmers. Similar results were noted in the studies conducted by Gaur (2008).

In contrast, Soodan et al. (2020) reported correlation coefficients for various factors such as age (0.107), education (0.231), experience in agriculture (0.086), type of family (0.265), land holding (0.126), number of training sessions attended (0.137), land holding (0.360), social participation (0.165), and scientific orientation (0.257).

It was found that the type of family has a positive and highly significant correlation (P < 0.01) with knowledge. This aligns with similar findings (Singh et al., 2010). Additionally, land holding was found to have a positive and highly significant correlation with knowledge. This could be attributed to advanced payments from the dairy, subsidies on purchasing dairy animals, and low-interest loans provided by the dairy cooperative. The study also indicated that socio-economic status and social participation show a negative and non-significant correlation with knowledge. This may be due to the favorable agricultural conditions in Balamau including irrigation, productive soil, and a favorable climate, as well as effective marketing of agricultural products. Similar results were observed by Hundal et al. (2016) and Razzaq et al. (2011). Scientific orientation is crucial, contributing to an increase in the knowledge level of dairy farmers and the eventual adoption of improved management practices. The research highlights that a positive and highly significant correlation exists between

the scientific orientation and knowledge. This can be attributed to the cooperative dairy's efforts in providing information about enhanced dairy management practices through activities like health camps, demonstration camps, livestock shows, dairy shows and entrepreneur training. These findings align with those reported by Singh et al. (2014).

The correlation coefficients for independent variables like age, socio-economic status, and social participation showed a range from negative and not significant to highly significant. This strongly indicates that these factors are indeed constraints affecting the acquisition of knowledge about managing dairy animals.

Table 5. Regression Co-efficients

Sl. No.	Variables	Coefficients	SE (b)	t value
1	Age	-0.013	0.014	-1.071
2	Education	0.09*	0.041	2.671
3	Experience in Agriculture	0.004	0.009	0.529
4	Type of Family	-0.050	0.018	-3.827
5	Socio-economic status	-0.089	0.079	-1.142
6	Number of trainings attended	0.072*	0.031	1.662
7	Landholding (ha)	-0.216	0.416	-0.531
8	Social Participation	0.254*	0.095	2.816
9	Scientific Orientation	0.025*	0.020	2.401

Table 6. Analysis of Variance

Source of Variation	DF	Sum of Squares	Mean Squares	F-Calculated	Significance
Regression	9	4.360	0.507	4.462	0.01358
Residual	15	3.440	0.165		
Total	24	9.000			

R- square value: 0.6210, Multiple R-value: 0.7353

Table 5 shows that the regression analysis considered nine independent variables. The R-squared value, which is 0.6210, indicates that these variables together account for 62.10% of the variation in the knowledge level. Among these nine variables, education, number of trainings attended, social participation, and scientific orientation displayed significant results at the 0.05 and 0.01 percent levels . For education, the positive coefficient of 0.09 suggests that higher education levels are linked to a better knowledge level. This underscores the importance of

investing in education for enhancing marketing strategies in agriculture. Similarly, the variable number of trainings attended has a positive coefficient of 0.072, indicating that attending more training sessions is associated with an increase in the knowledge level.

In the regression model, the number of training sessions attended had a coefficient of 0.072. This means that for each additional training attended, the knowledge level was expected to increase by 0.072 units. These findings align with the observations made by Subha et al. (2022) and Rao et al. (2009). Social participation showed a positive coefficient of 0.254, indicating that active engagement in social activities related to agriculture positively influenced the knowledge level. Collaborating and networking within the agricultural community are beneficial for enhancing knowledge about marketing. Scientific orientation also had a positive coefficient of 0.025, emphasizing that a stronger scientific approach to farming is linked to a higher knowledge level. Adopting evidence-based practices is crucial for effective agricultural marketing strategies. The study's findings were supported by other researchers, adding credibility to the identified relationships. The results can guide policymakers, educators, and agricultural professionals in developing strategies to improve marketing skills, disseminate knowledge, and encourage social engagement in agriculture. The text briefly mentions the training needs of a group in dairy management practices, highlighting the importance of expertise in areas like breed improvement, feeding management, and general entrepreneurial skills for success in commercial dairy management. Overall, the study underscores the significance of education, continuous learning, social engagement, and scientific orientation in enhancing dairy management practices, providing valuable insights for stakeholders in the field.

CONCLUSION

The study offers insights into the socio-economic landscape and dairy farming practices in the Balamau block of Hardoi district, U.P. The educational background, and varied occupational engagements underscore the complexity of this sector. The findings offer insights into reproductive parameters, adoption of scientific management and animal husbandry practices for improvement & optimization. The alignment of our results with previous research enhances the credibility of our findings, holding significant implications for dairy sector policies and interventions. Prioritizing education and awareness, particularly in animal health practices, is crucial for dairy farmers' progress. Promoting enhanced breeding techniques and addressing age at first calving challenges, can bolster productivity. The findings also reveal that poultry and mushroom enterprises need heightened focus, milk cooperative societies and cross breeding programmes need to be expanded which are crucial for the industry's growth.

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