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Evaluation of feeding management practices adopted by crossbred dairy farmers in Jaipur district of Rajasthan

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Abstract
The study evaluated the feeding management practices adopted by crossbred cattle owners in the Chomu and Amer tehsils of Jaipur district, Rajasthan. Data were collected from 200 respondents, covering a total of 887 cows (416 from Chomu and 471 from Amer), through structured and pre-tested interviews. The findings revealed that stall feeding was the predominant system (94%), followed by stall+ grazing (6%). Cultivated green fodder was the main source (95%), while only 5% of respondents relied on purchased fodder. Regarding fodder type 69% of farmers fed a mix of legume and non-legume, 24% fed non-legume only and 7% fed legume only. Dry fodder was mostly provided as a mixture (78%), whereas 22% fed wheat straw alone. Green fodder was chopped by 58.5% of farmers and 13.5% preserved excess fodder for future use. Concentrate feeds were offered as a combination of home-prepared and commercial feed by 62.5% of farmers, commercial feed alone by 35.5% and home-prepared feed alone by 2%. Pre-treatment of concentrates included soaking (41.5%), feeding as such (37%) and boiling (21.5%). The use of Sani was reported by 68.5% of respondents, mineral mixture supplementation by 66.5% (37.5% chelated and 29% non-chelated) and common salt feeding by 90.5%. Chaff cutters were used by 95.5% of farmers, and tubewells served as the primary water source (95%) with watering frequency reported as four times daily by 51.5% of farmers, three times by 36.5%, and twice by 12%. This study was therefore conducted to assess the feeding practices of crossbred cattle owners in Jaipur district, focusing on feed types, quality, supplementation, and frequency, with the aim of understanding their impact on milk yield, animal health, and the profitability of crossbred dairy farming in the region.

Keywords: Feeding, crossbred cattle, fodder, concentrate, mineral mixture, salt, sani, chaff cutter, watering, Jaipur and Rajasthan

Introduction
Livestock rearing is a vital component of rural livelihoods in Rajasthan, significantly contributing to household income, nutritional security and agricultural sustainability. In Jaipur district, cattle form a major part of the livestock sector, with a total population of 691,457, including 360,780 crossbred cattle according to the 20th Livestock Census, 2019. Crossbred cows produce an average of 9.784 kg of milk per day, surpassing indigenous cows 6.569 kg/day and non-descript cows 4.343 kg/day, highlighting their superior productivity and economic significance. Rajasthan contributed 14.51% of India's total milk production in 2023–24, with per capita milk availability of 1,171 g/day, more than double the national average. India's dairy sector produced 239.30 million tonnes of milk in 2023–24, showing a steady CAGR of 4.97% between 2018–19 and 2023–24, while crossbred cows in the country yield an average of 8.35 kg/day compared to 4.20 kg/day for indigenous cows, with per-capita availability of 471 g/day according to (Basic Animal Husbandry Statistics, 2024). Despite these gains, persistent feed and fodder shortages, estimated at 20–25% for dry fodder and 12–15% for green fodder, directly affect milk productivity, nutritional status, and overall health of dairy cattle as reported by (DAHD, 2023) [5]. In Jaipur, while crossbred cattle have significantly enhanced milk production, feeding practices remain a critical factor influencing performance.

Materials and Method
The present study was conducted in Jaipur district of Rajasthan, purposively selected for its highest crossbred cattle population.

Two tehsils (Chomu and Amer) with the highest number of crossbred cattle were chosen and from each tehsil ten villages were selected based on cattle density, totaling 20 villages. From each village 10 farmers were randomly selected, yielding a sample size of 200 respondents. Data were collected during 2023–2024 through a pre-tested interview schedule via personal interviews, visual observations and direct measurements. The schedule comprised management-related parameters. Statistical analyses such as frequency, percentage, chi-square test and p-value calculations were employed to interpret the data meaningfully and identify significant differences across variables.

Results and Discussion

1. Feeding management practices

Feeding management significantly affects the health and productivity of crossbred cattle. The study examined various feeding systems adopted by farmers in Chomu and Amer with detailed data in Table 1.

1.1 System of Feeding

Revealed that the high adoption of stall feeding (94%) reflects farmers' preference for controlled nutrition and reduced disease risk, while the low use of combined stall and grazing (6%) indicates limited land and a shift toward intensive dairy farming. This contrasts with earlier findings, where Deoras *et al.* (2002) [4] reported mostly grazing, Choudhary *et al*. (2019) [3] noted 41.7% combined systems and Ruhul Amin *et al.* (2020) [13] observed only 26.4% stall feeding. Patil *et al.* (2022) [10] and Singh *et al.* (2023) [15] reported mixed practices in other regions.

1.2 Source of Green Fodder

Observed that the majority of farmers (95%) cultivated green fodder on their own or hired land, with Amer (98%) slightly higher than Chomu (92%), while only 5% purchased fodder. These results align with Kasondra *et al.* (2023) [9] and Abapara *et al.* (2010), highlighting a strong trend toward self-reliant fodder production among dairy.

1.3 Type of Green Fodder Feed

Highlighted that most farmers (69%) fed a mix of legume and non-legume green fodder, while 24% used only non-legume and 7% only legume fodder. The type of fodder fed did not vary significantly between Chomu and Amer. Compared to Patel *et al*. (2014) [11], who reported higher sole legume use, this study shows a clear preference for mixed fodder to ensure balanced nutrition.

1.4 Dry Fodder Fed

Noted that most farmers (78%) fed a mix of dry fodder, while 22% used only wheat straw. The pattern of dry fodder feeding was similar in Chomu and Amer. Compared to earlier reports by Tanwar *et al.* (2012) [17] and Sinha *et al.* (2009) [16], which showed higher sole wheat straw use, this indicates a shift toward mixed dry fodder for better nutrition and rumen health.

1.5 Chopping of Green Fodder

Reported that most farmers (58.5%) chopped green fodder before feeding, while 41.5% did not, with no significant difference between Chomu and Amer. Chopping improves feed intake, digestibility, and reduces wastage, enhancing milk production. Adoption in this study was lower than Kadam (2019) [8], who reported 94.17% usage.

1.6 Preservation of Excess Green Fodder

Documented that only 13.5% of farmers preserved excess green fodder as silage or hay, while 86.5% did not, with 11% in Chomu and 16% in Amer practicing preservation. The low adoption, consistent with Sinha *et al.* (2009) [16], indicates limited awareness, technical knowledge, or resources among farmers.

1.7 Type of Concentrate Feed

Identified that most farmers (62.5%) fed a combination of home-prepared and commercial concentrate feeds, 35.5% used only commercial feed, and 2% prepared feed at home, with no significant difference between Chomu and Amer. The preference for mixed feeding, as noted by Patel *et al.* (2014) [11], balances cost with nutritional adequacy for crossbred cattle.

1.8 Pre-Treatment of Concentrate Fed

Demonstrated that most farmers (41.5%) soaked concentrate feed, 21.5% boiled it, and 37% fed it untreated, with significant variation between Chomu and Amer. Soaking was more common in Amer (52%) than Chomu (31%) and was the most used pre-treatment method, partially aligning with Rathore (2010) [12] who reported 78.5% in Churu and Tanwar *et al.* (2012) [17] who found 65% and 61.7% adoption among cooperative and non-cooperative farmers in Jaipur.

1.9 Use of Sani

Reported that most farmers (68.5%) used the sani technique (mixing concentrate with fodder), with similar adoption in Chomu (68%) and Amer (69%). Sani feeding improves palatability, digestibility, nutrient availability, and milk yield. Some farmers (32%) did not adopt it, likely due to lack of awareness or traditional practices, highlighting the need for training and extension programs to promote scientific feeding.

1.10 Feeding of Mineral Mixture

Indicated that about two-thirds (66.5%) of farmers provided mineral mixtures to their crossbred cattle 68% in Chomu and 65% in Amer with no significant regional difference. This adoption level was considerably higher than earlier studies, such as Rathore (2010) [12] who reported 17.25% and 32.25% in Churu, Choudhary *et al.* (2019) [3] who found 90% non-users in Hisar, and Patil *et al.* (2022) [10] who noted only 16% in Maharashtra. Similarly, Singh *et al.* (2019) [14] recorded just 23.3% regular users in Punjab, indicating improved awareness and adoption of mineral supplementation in the present study area.

1.11 Type of Mineral Mixture Fed

Highlighted that overall, 37.5% of farmers used chelated mineral mixtures, while 29% provided non-chelated forms to their crossbred cattle. The use of chelated minerals was higher in Chomu (43%) than in Amer (32%). These findings indicate a growing awareness among farmers about the benefits of chelated mineral supplementation, which enhances mineral absorption and improves animal productivity.

1.12 Feeding of Common Salt

Observed that common salt supplementation was widely adopted by farmers, with 90.5% providing it to their crossbred cattle 88% in Chomu and 93% in Amer. This high adoption rate agrees with Babu *et al*. (2020) [2], who also reported widespread salt feeding among dairy farmers, indicating better awareness of its role in maintaining electrolyte balance and feed intake. Earlier reports, such as Deoras *et al.* (2002)

[4] and Devasena *et al.* (2015) [7], showed more variation and lower adoption, suggesting that the practice has become more consistent and common in recent years.

1.13 Use of Chaff Cutter

Documented that the majority of farmers (95.5%) used chaff-cutters for chopping green and dry fodder, with 93% adoption in Chomu and 98% in Amer. Only 4.5% of farmers did not use chaff-cutters. The widespread use of chaff-cutters reflects farmers' awareness of their benefits in improving fodder utilization, reducing wastage and enhancing feed intake efficiency among crossbred cattle.

1.14 Source of Drinking Water

Revealed that most crossbred cattle farmers (95%) used tube wells as the main source of drinking water 92% in Chomu and 98% in Amer while only 5% depended on farm ponds. The widespread use of tube wells highlights the preference for reliable and clean water sources to ensure better animal health and productivity.

1.15 Frequency of Watering

Reported that watering frequency varied among farmers, but none provided water only once a day, showing good awareness of hydration needs. About 12% of farmers watered their cattle twice daily, 36.5% three times, and a majority (51.5%) four times a day 43% in Chomu and 63% in Amer. This indicates that 88% of farmers ensured watering at least three times daily, reflecting improved management practices compared to Singh *et al.* (2023) [15] in Udaipur, where most farmers provided water only twice a day.

Table 1: Feeding management practices adopted by Crossbred cattle

S. No.	Feeding Practice	Chomu		Amer		Overall		χ^2value	P value
		f	%	f	%	f	%		
1.	**System of Feeding**								
a	Stall	92	92.00	96	96.00	188	94.00	1.418	0.234
b	Stall+grazing own land	8	8.00	4	4.00	12	6.00		
c	Grazing alone	0	0.00	0	0.00	0	0.00		
2.	**Source of green fodder**								
a	Cultivated	92	92.00	98	98.00	190	95.00	4.856	0.088
b	Purchase from other	8	8.00	2	2.00	10	5.00		
3.	**Type of green fodder**								
a	Non legume	30	30.00	18	18.00	48	24.00	5.787	0.122
b	Legume	8	8.00	6	6.00	14	7.00		
c	Mix	62	62.00	76	76.00	138	69.00		
4.	**Dry fodder fed**								
a	Wheat straw	19	19.00	25	25.00	44	22.00	1.807	0.179
b	Mix	81	81.00	75	75.00	156	78.00		
5.	**Chopping of green fodder**								
a	Yes	64	64.00	53	53.00	117	58.50	2.492	0.114
b	No	36	36.00	47	47.00	83	41.50		
6.	**Preservation of excess of green fodder**								
a	Yes	11	11.00	16	16.00	27	13.50	1.932	0.186
b	No	89	89.00	84	84.00	173	86.50		
7.	**Type of concentrate feed**								
a	Prepared in home	4	4.00	0	00.00	4	2.00	4.086	0.130
b	Commercial cattle feed	35	35.00	36	36.00	71	35.50		
c	Prepared in home+ Commercial cattle feed	61	61.00	64	64.00	125	62.50		
8.	**Pre-treatment of concentrate feed**								
a	Soaking	31	31.00	52	52.00	83	41.50	9.101	0.011
b	Boiling	25	25.00	18	18.00	43	21.50		
c	As such	44	44.00	30	30.00	74	37.00		
9.	**Use of sani**								
a	Yes	68	68.00	69	69.00	137	68.50	0.023	0.879
b	No	32	32.00	31	31.00	63	31.50		
10.	**Feeding of mineral mixture**								
a	Yes	68	68.00	65	65.00	133	66.50	0.202	0.653
b	No	32	32.00	35	35.00	67	33.50		
11.	**Type of mineral mixture fed**								
a	Not Use	32	32.00	35	35.00	67	33.50	2.851	0.240
b	Chelated	43	43.00	32	32.00	75	37.50		
c	Non Chelated	25	25.00	33	33.00	58	29.00		
12.	**Feeding of common salt**								
a	Yes	88	88.00	93	93.00	181	90.50	1.454	0.228
b	No	12	12.00	7	7.00	19	9.50		
13.	**Use of chaff cutter**								
a	Yes	93	93.00	98	98.00	191	95.50	2.909	0.088
b	No	7	7.00	2	2.00	9	4.50		
14.	**Source of drinking water**								
a	Tubewell	92	92.00	98	98.00	190	95.00	3.789	0.052
b	Farm pond	8	8.00	2	2.00	10	5.00		
15.	**Frequency of watering**								
a	Once in day	0	0.00	0	0.00	0	0.00	9.516	0.023
b	Twice in day	15	15.00	9	9.00	24	12.00		
c	Three times in day	42	42.00	31	31.00	73	36.50		
d	Four times in day	43	43.00	60	60.00	103	51.50		

Conclusion

The results of the present study indicate that feeding management practices adopted by crossbred cattle farmers in both Chomu and Amer tehsils were largely similar and followed conventional recommendations. Most farmers relied on stall feeding, predominantly used cultivated green fodder and provided a mix of legume and non-legume fodder. Dry fodder and concentrate feeding practices were consistent across tehsils, with a majority using a combination of home-prepared and commercial feeds. However, significant differences were observed in the pre-treatment of concentrate feed, with farmers in Amer more frequently soaking feed before feeding. The use of sanitation measures, mineral mixtures, common salt, and chaff cutters was widespread, reflecting adherence to basic feeding hygiene and nutrition protocols. Watering practices varied, with a notable proportion of farmers providing water three to four times a day. Overall, while most feeding practices were satisfactory and uniform across tehsils, targeted interventions such as promoting proper pre-treatment of concentrates and optimizing watering frequency could further improve the nutritional management and productivity of crossbred cattle in the region.

Conflict of Interest

Not available

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Not available

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