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Original Research

Comparative Feeding Practices in Specialized Dairy Farms in Gujarat Regions

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Abstract

A study was carried out to compare the feeding management practices of specialized dairy farms of north and south Gujarat. The data were collected from ten specialized dairy farm each from north and south Gujarat. Analyzed data revealed that many dairy farms (40%) were using TMR feeding for their animals. Majority (85%) of the respondents has fed purchased readymade concentrate (mainly Sabardan and Amuldan) and 15 percent of the respondents have used self-made concentrate feed. It showed that green maize, rajka-bajri and hybrid Napier grass was major source of green fodder fulfilling 80-90% of green fodder requirement in north region used by 5, 3 and 2% farms, respectively during July to February. The availability and utilization of green fodder during same period in south Gujarat was totally different i.e. sugarcane, sorghum, marvel grass and hybrid Napier grass used by 6, 1, 1 and 2 farms, respectively as 70-90% source of green fodder.

Keywords: Fodder Availability, Fodder Utilization, Maize Silage, Total Mixed Ration

Introduction

Dairy farming as mixed farming is a backbone of Indian Agriculture and source of employment in rural areas for centuries. Traditionally it is based on feeding of crop residues and byproducts; grasses etc. Mostly they are managing their livestock by locally available feed resources, hence, their production level remains lower than potential. Specialized dairy farming is new and challenging enterprise. To achieve profitability in specialized dairy farms they need to use scientific and modern feeding, breeding and management with possible farm mechanization. Now-a-days many areas in Gujarat having good numbers of specialized farms. Many such farm owners are claims themselves as most profitable farms, whereas, some are in closed due to loss. It may be due to faulty management practices. FAO has recommended good dairy farming practices. Commercial dairy farms so far studied revealed that adoption of animal feeding and animal welfare practices was high in Karnataka (Sathisha *et al.,* 2018). However, availability and high cost of feed and fodder particular of green fodder is always remained big constraints in India (Harisha *et al.,* 2019). Therefore, it needs systemic study. Among 33 districts of Gujarat, from north Gujarat, Banaskantha and Sabarkantha districts and from south Gujarat, Bharuch, Surat and Navsari districts are known for milk production, specialized dairy farms adopting modern technologies, and established cooperative milk producers' unions. The agro-climatic condition in both regions are quite different as north Gujarat has semi-arid to dry climate with less rainfall, whereas south Gujarat falls under medium to heavy rainfall zone. Specialized dairy farming in both regions needs to be understood considering its importance. However, not much work has been carried out about comparative aspects of prevailing management practices of dairy farmers from these regions, hence, present study was carried out.

Materials and Methods

The dairy farms which contributed more than 50 per cent in total income of farm owners were considered specialized dairy farms. A list was prepared for all such farms in selected districts i.e. Surat, Navsari, Bharuch, Banaskantha and Sabarkantha which were having minimum 40 heads of either white cattle or buffalo. Sabarkantha districts were having 25 farms whereas Banaskantha has such 5 farms. From this both district 10 farms were selected randomly as a sample of north Gujarat. To study specialized farms in heavy to medium heavy rainfall zone, 10 specialized dairy farms were selected randomly from Surat, Bharuch and Navsari districts of south Gujarat from available 31 farms. The information pertaining to prevailing management practices was collected by interviewing respondents by using questionnaire method. Collected data were tabulated, analyzed using frequency and percentages and compared by chi-square test following Snedecor and Cochran (1994).

Results and Discussion

Feeding Management Practices

Data presented in Table 1 revealed that majority of the respondents (90%) cultivated green fodder crops. These findings are higher than Shitole *et al.* (2009) who reported that 65.83 per cent of the farmers cultivate green fodder detailed study of data revealed that about 40 per cent of the dairy farms were using total mixed ration (TMR) feeding for their animals which is eye catching adoption. As TMR is a practice of weighing and blending all feedstuffs into a nutritionally balanced ration, which provides adequate nourishment to meet the needs of dairy cattle to help them achieve maximum performance. Present study shows that few dairy farms understand the important of TMR feeding to their animals but still more dairy farms need to train about important of TMR feeding to enhance the milk production and economic output of their dairy farms. Majority of respondents were feeding twice a day except three farms of south Gujarat that have adopted one time feeding. Many reports (Sabapara *et al.,* 2016, Khadda *et al.,* 2017) revealed that dairy farmers of Gujarat are feeding twice or thrice in a day. However, if manger is enough capacious and TMR is to be fed once feeding is labour saving. Data in Table 1 revealed that majority (85%) of the respondents was feeding purchased readymade concentrate (mainly Sabardan and Amuldan) and 15 percent of the respondents have used self-made concentrate feed. There were some dairy farms that possessed their own feed factory due to that they used self-made concentrate feed. Present findings are in conformity with the results of Khadda *et al.* (2017). Table 1 revealed that concentrate feeding practice was significantly different between two regions. Majority (78.90%) of the respondents was provided extra concentrate feeding during advanced pregnancy to their animals which was similar between two regions. Present findings are contrary with the findings of Sekhar *et al.* (2017) who reported that extra concentrate feeding during advanced pregnancy was adopted by overall 28.0 per cent of the dairy farms.

Table 1: Distribution of the dairy farms of north and south Gujarat according to feeding system and frequency

S. No.	Practices	North		South		Over all		Chi square	
		n	%	n	%	n	%	F	P
1	**Cultivation of green fodder**							2.22	0.13
	Yes	10	100	8	80	18	90		
	No	0	0	2	20	2	10		
2	**Feeding of TMR**							0.83	0.36
	Yes	5	50	3	30	8	40		
	No	5	50	7	70	12	60		
3	**Type of concentrate feed**							0.39	0.53
	Self-made	2	20	1	10	3	15		
	Ready-made	8	80	9	90	17	85		
4	**Extra concentrate feeding during advanced pregnancy**							1.01	0.31
	Yes	7	70	8	88.9	15	78.9		
	No	3	75	1	11.1	4	21.1		
5	Time of concentrate feeding							0.26	0.6
	Before milking	7	70	8	80	15	75		
	After milking	3	30	2	20	5	25		
6	**Quantity of concentrate fed to the young animal per day**							11.27	0.00*
	1.5kg	7	70	0	0	7	35		
	2 kg	3	30	8	80	11	55		
	2.5kg	0	0	2	20	2	10		
7	**Quantity of concentrate fed to the adult animal per day**							11.27	0.00*
	2.5kg	7	70	0	0	7	35		
	3.0kg	3	30	8	80	11	55		
	3.5kg	0	0	2	20	2	10		
8	**Quantity of concentrate fed to the breeding bull per day**							5.13	0.02*
	3kg	6	66.7	1	12.5	7	41.2		
	3.5kg	3	33.3	7	87.5	10	58.8		
9	**Quantity of concentrate fed to the <=10 kg milk yielding animal per day**							5.49	0.01*
	1kg. per 2kg milk	4	40	9	90	13	65		
	1kg. per 2.5kg milk	6	60	1	10	7	35		
10	**Quantity of concentrate fed to the >10kgs milk yielding animal per day**							5.49	0.01*
	1kg. per 1kg milk	4	40	9	90	13	65		
	1kg. per 2kg milk	6	60	1	10	7	35		

**Availability of feed and fodder in various season with their comparative price*

Majority (75%) dairy farms were feeding concentrate feed before milking of their milch animals which was also similar between two regions. However, few (25%) dairy farms were feeding concentrate after milking. As per dairy farms owner's belief, feeding of concentrate after milking prevents them seating immediately after milking. It is required to prevent entry of mastitis causing pathogens into loose teat canal just after milking. One more reason to offer concentrate after milking is to prevent the animal to develop habit to let down after concentrate feeding. This finding is similar with the results of Jadav *et al.* (2014) who reported that more than two third of the respondents (71%) offered concentrate to animals after milking. Data in Table 1 observed that more than half of the dairy farms (55%) provided 2 kg and 3 kg quantity of concentrate feed to their young and adult animal per day, respectively. Significantly higher number of dairy farms of north Gujarat was feeding 2.5 Kg concentrate. Two farms in south Gujarat were feeing 3.5 Kg concentrate. It indicated that all the dairy farms followed the age criteria for the feeding of concentrate. Jadav *et al.* (2014) reported that not any single dairy farmers followed the age criteria for the feeding of concentrate. Around 58.8 per cent dairy farm owners provided 3.5 kg concentrate feed to breeding bull per day. Data in Table 1 indicated that majority (65%) respondents provided 1 kg concentrate per 2 kg milk and 1 kg. concentrate per 1 kg milk to the <=10 kg and >10 kg milk yielding animal per day, respectively. Result of present study suggested that most of dairy farms provided concentrates to their milking animal on the basis of their milk

production. It was supported by Sabapara *et al.* (2016) who reported that majority dairy farmers (90%) fed concentrates to their milking animal on the basis of their milk production. Overall results of quantity of concentrate feeding to the animals in present study indicated that all the dairy farms (100%) followed the practice of concentrate feeding based on age, breeding and milk production criteria of animal. The concentrate feeding practice looked significantly different between both regions might be associated with fact that in urban area due to lack of storage facility for dry fodder, they are relied largely on concentrate. Feeding practices depend on farm size as per interesting findings of Sathisha *et al.* (2018). They stated that adoption level of feeding practices in medium and large farmers was high but average adoption level of small farmers was medium.

The green fodder availability, price and utilization pattern during various seasons presented in the Table 2. It showed that green maize, *rajka bajri* and hybrid Napier grass was major source of green fodder fulfilling 80-90% of green fodder requirement in north region used by 5, 3 and 2 farms, respectively during July to February. The availability and utilization of green fodder during same period in south Gujarat was totally different i.e. sugarcane, sorghum, marvel grass and hybrid Napier grass used by 6, 1, 1 and 2 farms, respectively as 70-90% source of green fodder. It was observed that during Feb to April maize silage was consisted of 70% in total green fodder fed by six farms, followed by lucerne (65%) fed by less than half of the dairy farms (40%) in north region. Maize silage is prepared and sold by Banas dairy at no profit basis to their members. Sugarcane top was major component (80%) in green fodder fed by all the dairy farms of south Gujarat. Usage of sugarcane and sugarcane tops to cattle and buffaloes as major source in commercial dairy farms in south Gujarat is also documented (Rathva *et al.,* 2020). However, during the May to June *bajra* (pearl millet) and *guar* was consisting 40 and 30 per cent, respectively in green fodders fed by only 40 and 30 per cent of the dairy farms, respectively in north region.

Table 2: Distribution of the dairy farms according to availability of feed and fodder in various seasons with their comparative price

Name of the Fodder	Region of Farm	Season	Price ₹/ kg	Utilization	
				No. of Farms	% Among Green/ Dry Fodder Fed
Green fodder					
Green Maize	North	July to Feb	1.5	5	90
Rajka bajri	North	July to Feb	2.5	3	80
Green sugarcane	South	July to Feb	2	6	90
Hybrid Napier	Both	July to Feb	1	2	80
Maize silage	North	Feb to April	1.5	6	70
Lucerne	North	Feb to April	2	4	65
Sugarcane top	South	Feb to April	1.5	10	80
Bajra (Pearl Millet)	North	May to June	4	4	40
Guar	North	May to June	7	2	30
Jowar	South	May to June	5	5	40
Green sorghum	South	May to June	5	4	50
Dry fodder					
Sorghum straw	Both	Round the year	4 to 7	7	45
Paddy straw	South	Round the year	4 to 5	10	50
Guar peels	North	Round the year	3 to 5	3	15
Wheat straw	North	Round the year	3 to 5	10	25
Concentrate					
Cottonseed cake	North	Round the year	26 to 28	10	20
Groundnut cake	North	Round the year	25	1	10
Wheat bran	North	Round the year	22 to 24	5	25
Maize cake	North	Round the year	24 to 26	3	25
Gram chuni	South	Round the year	29 to 31	2	35
Pigeon pea chuni	South	Round the year	24 to 30	2	40
Rice bran	South	Round the year	18 to 24	10	40

Whereas, sorghum and jowar was fed by 40 and 50 per cent of the dairy farms, respectively in south region which was fulfilling 40-50% of green fodder requirement. This finding is supported by Shah *et al.* (2011) reported that

among the total green fodder fed bajra, green grass, maize and sorghum was used for feeding crossbred cattle during rainy season while during winter season lucerne, green grass and maize were feed to crossbred cattle. They further reported that, during summer major component of green fodder was *bajra* followed by *jowar* and lucerne in Banaskantha, Sabarkantha and Panchmahal districts of north Gujarat. It is depicted from Table 2 that green fodders available in north Gujarat between July to Feb months were green maize and *rajka bajri* with comparative price around ₹1.5 and 2.5 per kg. During same time green sugarcane with comparative price around ₹2 per kg was used for feeding in south region. Hybrid Napier was available in both regions. In Feb to April maize silage and lucerne were important source with price around ₹1.5 and 2 per kg, respectively in north Gujarat whereas, in south Gujarat cheaper but of poor-quality sugarcane top was main source of green. In between May to June *bajra* (pearl millet) and *guar* was available in north Gujarat. *Jowar* was important fodder during May-June in south Gujarat. Gupta *et al.* (2020) also reported seasonality in green fodder availability in Rajasthan, they reported that majority of farmers (83.33%) did not feed green fodder to their animals round the year because the farmers of Banswara district have small land holding and most of dairy farmers does not have irrigation source in winter and summer season so they are unable to provide green fodder round of the year. In north and south region dry fodder used were *guar* peels and paddy straw round the year. Rathva *et al.* (2020) also observed that paddy straw was main dry fodder in commercial dairy farms in south Gujarat. However, sorghum straw and wheat straw was also available in both regions round the year. Cottonseed cake, groundnut cake, wheat bran and maize cake with comparative price around 26 to 28, 25, 22 to 24 and 24 to 26 (₹/kg), respectively was used in north Gujarat round the year. Farms of south region fed *gram chuni*, *pigeon pea chuni* and rice bran with comparative price around 29 to 31, 24 to 30 and 18 to 24 (₹/kg), respectively. This finding is supported by Sabapara *et al.* (2016) who reported that majority (96 and 92 %) of the dairy farmers of south Gujarat fed sugarcane top and paddy straw as a green and dry fodder, respectively to their animals.

Conclusion

There is a wide scope of different varieties of green fodder crop like green maize, *rajka-bajri, bajra,* lucerne and *guar* also well-organized co-operative dairy sector of north region providing prepared maize silage in bag at the cost of 7-8 (₹)/kg to their dairy farmers while, in south region no such varieties of fodder crop are available instead of that they have to depends mainly on crop residues like sugarcane top that having a higher risk of oxalate toxicity.

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Conflict of Interests

There is no conflict of interest.

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