

## RESEARCH ARTICLE

# Adoption of Breeding and Calf Rearing Practices in Modern Dairy Farms of Gujarat

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### ABSTRACT

A study was carried out to compare the breeding and calf rearing practices of modern specialized dairy farms of north and south Gujarat. The data was collected from ten specialized dairy farms, each from the north and south Gujarat. The study revealed that farms of the southern region mostly reared buffaloes, which relied on natural service, whereas northern farms mostly reared cows, and AI was more popular. Around 22.2 and 16.7% of dairy farms preferred pedigreed and sex-sorted semen from the private sector, respectively. Most of the dairy farms (60%) purchased frozen semen doses from the co-operative sector. About 20% of dairy farms used sex-sorted semen at the price of Rs. 2100-3000 per dose. One farm from the north and another one from south were using Delaval® heat detector system. The majority (75%) of the dairy farms adopted the practice of colostrum feeding by allowing for natural suckling. The majority (70%) of the dairy farms provided first colostrum feeding within 2 to 4 hours of calf birth. Some dairy farms (20%) possessed individual calf boxes. From the research finding, it can be concluded that artificial insemination was more famous in north Gujarat. Many specialized dairy farms of north Gujarat were adopting most advanced breeding practices by the use of sex-sorted and pedigreed semen of private companies to produce an offspring of the desired sex, high milk yielding potential and healthy one.

**Keywords:** Heat detector, Individual calf boxes, Ligation, Pedigreed semen, Sex sorted semen.

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### INTRODUCTION

Dairy farming in India is mostly carried out as a mixed farming system by smallholder farmers along with agriculture. However, specialized dairy farms are business-oriented systems that may be feasible at the era of growing urbanization. Specialized dairy farms need to be professional for management practices with possible farm mechanization. Many eye-catching technology like sex-sorted semen, heat detector, calving alarm, calf feeder, colostrum feeding tube, etc. have entered the market with a good impact. Accurate prediction of calving by alarm or zoometry can save the life of calf as well as a dam (Sorathiya *et al.*, 2019). However, such new technology is costly for developing countries like India. Among various said modern practices, calf rearing and breeding are important for sustainable dairy farming. Patel *et al.* (2017) reported the highest mortality in Surti buffalo calves in the age group below one month. Therefore, calf management should focus more during the first month of life. Further, in the era of sex-sorted semen from progeny tested bull, breeding practices particularly having great value for identifying the technological gap to develop suitable dairy development program. Hence, the present study was conducted to assess the comparative aspects of prevailing calf and breeding management practices of modern dairy farms in both these regions.

### MATERIALS AND METHODS

Dairy farms providing 50% or more shares in the total income of their owners are considered as specialized dairy farms.

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A list was prepared for all such farms in selected districts, *i.e.*, Surat, Navsari, Bharuch, Banaskantha, and Sabarkantha, which had a minimum of 40 heads of either white cattle or buffalo. Sabarkantha district had 25 farms, whereas Banaskantha had such five farms. From both these districts, 10 farms were selected randomly as a sample of north Gujarat. To study specialized farms in heavy to medium heavy rainfall zone of south Gujarat, 10 specialized dairy farms were selected randomly from Surat, Bharuch and Navsari districts from available 31 farms. The information pertaining to prevailing breeding and calf management practices was collected by

interviewing respondents by using an interview schedule. Collected data were tabulated, analyzed using frequency and percentages and compared by the chi-square test following Snedecor and Cochran (1994).

## RESULTS AND DISCUSSION

### Breeding Practices

The information regarding breeding practices followed by dairy farms are presented in Table 1. It is apparent from the Table that the majority (75%) of the respondents used AI together with natural service. AI was significantly more used in farms of north Gujarat, perhaps due to more number of cattle kept. Moreover, pedigreed crossbred bulls are not

available easily and AI works better in cattle. Hence it was more popular in cattle. Further, sex-sorted semen doses of cattle are available in the market, which is promoted in AI just to prevent or reduce the probability of male calf birth, which are very difficult to dispose of due to strict legislation in Gujarat. However, the majority (75%) of dairy farms used both AI and natural service for breeding.

Majority (80%) of dairy farms of the north region called AI worker, whereas half of the four each dairy farms of south region called either para-vets or AI workers for doing AI to their animals. These findings are more or less in agreement with Tewari *et al.* (2016). Table 1 depicted that majority (55%) of dairy farms preferred frozen semen dose of Government or Co-operative sector in both the region. Further, about 20

**Table 1:** Distribution of dairy farms in north and south Gujarat according to breeding practices followed

Criteria	Practices	North		South		Overall		Chi-square	
		$n_1$	%	$n_2$	%	$n$	%	F	P
Method of breeding	AI	3	30	00	00	3	15.0	5.06	0.07
	Natural service (NS)	00	00	2	20	2	10.0		
	AI + NS	7	70	8	80	15	75.0		
AI done by	No AI	0	00	2	20	2	10.0	7.20	0.02*
	Veterinarian	2	20	00	00	2	10.0		
	Para-vet	00	00	4	40	4	20.0		
	AI worker	8	80	4	40	12	60.0		
	No AI	0	00	2	20	2	10.0		
Preference of semen doses	Govt/coop sector	5	50	6	60	11	55.0	1.21	0.54
	Pedigreed semen from the private sector	3	30	1	10	4	20.0		
	Sex sorted semen from private sector	2	20	1	10	3	15.0		
Dose of semen maintained by	No AI	0	00	2	20	2	10.0	0.45	0.50
	Owner themselves	4	40	2	25	6	30.0		
	Inseminators	6	60	6	60	12	60.0		
Dose of semen purchased from	No AI	0	00	2	20	2	10.0	0.45	0.50
	Cooperative dairy sector	6	60	6	60	12	60.0		
Cost of Dose	Private Company	4	40	2	20	6	30.0	1.02	0.31
	No AI	0	00	1	10	1	05.0		
Regular dose	Rs. 100-200	5	50	6	60	11	55.0	1.33	0.24
	Rs. 1500-2000	3	30	1	10	4	20.0		
	Rs. 2100-3000	2	20	2	20	4	20.0		
Preference for breeding bull	Banni	00	00	5	50	5	25.0	20.0	0.00*
	Mehsani	00	00	3	30	3	15.0		
	Crossbred	7	70	00	00	7	35.0		
	Jaffrabadi	00	00	1	10	1	05.0		
	Gir	00	00	1	10	1	05.0		
	Not adopted any bull	3	30	00	00	3	15.0		
Methods of heat detection	Symptoms	2	20	1	10	3	15.0	0.40	0.81
	Symptoms along with bull	7	70	8	80	15	75.0		
	Delaval® heat detector	1	10	1	10	2	10.0		
Pregnancy diagnosis	Own judgment	00	00	3	30	3	15.0	5.11	0.07
	Qualified Veterinarian	6	60	2	20	8	40.0		
	Para-vet	4	40	5	50	9	45.0		
Breeding records maintained, Yes		5	50	7	70	12	60.0	0.83	0.36



and 15% of dairy farms preferred pedigreed and sex-sorted semen from the private sector, respectively. Semen doses of both types were available in the market, and most of the dairy farms used such semen of ABS and SEMEX like private companies. Use of sex-sorted and pedigree semen will prove as a game-changer for all such dairy farms through the birth of more number of healthy and high yielding heifers. However, the overall use of sex-sorted and pedigreed semen in both the region was very limited because of its high cost, less availability, and less awareness. BAIF Development Research Foundation (BDRF), in collaboration with Sexing Technologies (ST), the US company has started laboratory in 2018 to produce and distribute "sexed semen" of bulls having a 90% plus likelihood at reasonable rates. In a similar study, Bir *et al.* (2017) observed 35% dairy farms practicing sexed sorted cattle semen in the United States.

Data in Table 1 reveals that 30% of dairy farms maintained frozen semen doses. Good numbers of dairy farms (30%) purchased doses from so-called pedigreed semen producers. A recent report revealed that out of total AI done in cattle and buffaloes 46, 24, and 30 % was by the government sector, cooperative sector, and private sector, respectively (Anonymous, 2019). Recently, a new technology called sex-sorted semen has emerged as landmark technology to control births of males. Therefore, different states are making it available at a subsidized rate against normal AI (non-sorted) costs Rs 20 per straw. Some dairy farms (15%) were happily paying per dose of Rs. 2100-3000 for sexed-semen.

The bull preference is significant between regions due to less demand for bull in crossbred cattle farms of north Gujarat. The majority (70%) of the dairy farms in the north region adopted crossbred bull of HF, whereas, Banni and Mehsana buffalo bulls were at preference in south Gujarat. The majority (75%) of the dairy farms followed the practice of heat detection by symptoms together with keeping breeding bulls in the female herd. However, an interesting and eye-catching fact came to know was that one farm each from north and south used Delaval® heat detector system, which is quite advanced heat detection system works based on the detection of activities of animals. Sabapara *et al.* (2016) observed all the dairy farmers using symptoms, and the majority (87%) of the dairy farmers used bull for heat detection in south Gujarat. Data of the present study show that dairy farms of both regions believed in heat symptoms together with keeping bull as an accurate and easy method of heat detection.

In less than half of the dairy farms (45%), pregnancy diagnosis was done by para-vets, while in 40 % of dairy farms, it was done by qualified veterinarians. Significantly more numbers of farms took service of veterinarians in north Gujarat. This finding was more or less similar to the reports of Sreedhar *et al.* (2016). It indicated that dairy farms of the south region did not prefer qualified veterinarians for pregnancy diagnosis. More than half of the dairy farms (60%) maintained the breeding record of their animals. It was statistically similar in both the region. This figure was higher

**Table 2:** Distribution of the dairy farms of North and South Gujarat according to calf rearing practices.

Sr. No.	Practices	North		South		Overall		Chi-square	
		$n_1$	%	$n_2$	%	$n$	%	$F$	$P$
1	Attended calving								
	Only day	3	30	6	60	9	45	1.81	0.17
	Day & night	7	70	4	40	11	55		
2	Practiced ligation and disinfection of the navel cord								
	Yes	8	80	7	70	15	75	0.26	0.60
	No	2	20	3	30	5	25		
3	Method of colostrum feeding								
	By natural suckling	7	70	8	80	15	75	0.26	0.60
	By bottle-feeding	3	30	2	20	5	25		
4	Time of colostrum feeding after birth								
	Within 2 to 4 hour	7	70	7	70	14	70	0.00	1.00
	More than 4 hour	3	30	3	30	6	30		
5	Weaning of calves								
	0 to 3 days	8	80	7	70	15	75	0.26	0.60
	> 3 days	2	20	3	30	5	25		
6	Practice of calf starter feeding at the age of								
	After 10 days	7	70	9	90	16	80	3.86	0.14
	After 15 days	3	30	1	10	4	20		
7	Housing of calves								
	Individual calf box	3	30	1	10	4	20	1.25	0.26
	Group housing under calf shed	7	70	9	90	16	80		

than that report of Kaur *et al.* (2017). Results of the present study indicate that dairy farms of both regions were aware about breeding records keeping.

### Calf Rearing Practices

The results of various calf rearing practices followed by dairy animal owners in the study area are presented in Table 2. It depicts that more than half (55%) of the dairy farms attended calving during the day and night. It was statistically similar for both regions. The majority of dairy farmers were aware of the presence during calving. This finding is in agreement with the result of Rathore *et al.* (2010). The majority (75%) of the dairy farms followed the practice of ligation/cutting of navel cord followed by disinfection. It was statistically similar for both the regions. This practice was higher than that reported by Yadav *et al.* (2016). This result indicated that dairy farmers of both regions were aware of the importance of ligation/cutting of navel cord.

A majority (75%) of the dairy farms had adopted the practice of colostrum feeding to calves by natural suckling, and few dairy farms (25%) used bottle feeding. It was statistically similar in both regions. The majority (70%) of the dairy farms provided first colostrum feeding within 2 to 4 hours after birth. It was statistically similar for both regions. This finding was in accordance with the reports of Sabapara *et al.* (2015).

All the dairy farms followed the practice of weaning of calves 0-3 days after birth. A majority (80%) of the dairy farms provided calf starters after attaining the age of 10-15 days in both the regions. This result is in controversy with the result of Pata *et al.* (2019), who reported that the majority (94.67%) of the dairy farmers followed concentrate feeding to calves after attaining the age of 3 months. It indicates that dairy farms of study area were aware of the scientific feeding strategy of dairy calves. A majority (80%) of the dairy farms provided group housing in the calf shed. Individual calf boxes are the most scientific way of calf rearing, mostly adopted in developed countries. It was eye-catching that four dairy farms (20%) possessed individual calf boxes.

### CONCLUSION

The modern dairy farms in Gujarat are following modern breeding concepts as many of them have started to use sex-sorted semen and semen from selected pedigreed bulls. The use of Delawal heat detector is an eye-catching practice followed by some of the farms. Calf management was considered seriously by most of the farms and was followed scientifically. In conclusion, breeding and calf rearing practices in specialized dairy farms are excellent in both north and south Gujarat.

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