International Journal of Livestock Research, Vol. 10 (9) Sep' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Comparison of Herd Profile Among Different Types of Dairy Farms in Kerala

Sabin George[1], P. C. Saseendran[2], K. S. Anil[2], V. L. Gleeja[2] and S. Pramod[3]

[1]College of Veterinary and Animal Sciences, Pookode, Wayanad, Kerala, INDIA
[2]College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala INDIA
[3]Livestock Research Station, Thiruvazhamkunnu, Palakkad, Kerala, INDIA

*Corresponding Author: sabin@kvasu.ac.in

How to cite this paper: George, S., Saseendran, P., Anil, K., Gleeja, V., & Pramod, S. (2020). Comparison of Herd Profile Among Different Types of Dairy Farms in Kerala. *International Journal of Livestock Research*, 10(9), 129-135. doi: http://dx.doi.org/10.5455/ijlr.20200516064332

Received : May 16, 2020
Accepted : Aug 23, 2020
Published : Sep 30, 2020

Abstract

The present study was conducted in five districts representing different agro-climatic zones in Kerala, in order to assess the herd profile of dairy farmers. The average herd size based on standard animal units were 3.13 ±0.08, 9.52 ± 0.3 and 36.38 ± 3.65, in small, medium and large farms respectively. Irrespective of farm size the preferred mode of replacement was purchase of animals. Own finance was the dominant source of money for animal purchase in all types of farms. Subsidy linked purchase was 20.6, 20.0 and 9.3 per cent in small, medium and large farms respectively. Majority of animals purchased in all farms were lactating animals. In small and medium farms majority of the animals belonged to the production level of 10-15 litres/day. Crossbred Holstein Friesian animals were more likely to be purchased by farmers irrespective of the size of farm. The proportion of pregnant animals was 27.44, 24.43 and 24.60 respectively in small, medium and large farms. Results showed that the average age of heifers were 20.49 months and 32.07 per cent heifers were pregnant. Irrespective of farm size majority of both male and female calves were below six months of age.

Keywords: Dairy, Farm, Herd, Large, Medium, Small

Introduction

The cattle population of Kerala was 13.42 lakh heads according to 20th livestock census report of India (Economic review, 2019). Planning board of Kerala mentioned that the share of livestock sector in gross value contributed from Agriculture sector of the state was about 27 per cent (Economic review, 2019). The milk production of the state peaked at 27.16 million tonnes in 2012-13 which dropped to 25.48 million tonnes in 2018-19 (NDDB, 2020). The dynamics of milk production, contribution to state economy and bovine population is closely related to the profile of cattle herds owned by farmers. Herd profiling systematically classifies the dairy cattle into calves, heifers, pregnant heifers, milch animals, dry animals and dry pregnant animals. The study of any production system would be meaningful only on the backdrop of specific agro-ecological situation which formed the basis for distinct production system in that area. Sastry (2000) pointed out that such zoning is a pre-requisite for regional planning for livestock development and integration of such regional plans into state and national plans. The usual practice is to classify dairy farms based on number of lactating animals into small or subsistence farms (1-3 cows), medium farms (4-10 cows) and large farms with more than 10 cows (KAU, 2010).The present study was undertaken to understand the herd profile among different types of dairy farms viz. small, medium and large in Kerala was carried out in 2016-17.

Materials and Methods

For the present study the respondents selected were dairy farmers who were members of the dairy co-operatives and enrolled in the Direct Benefit Transfer (DBT) scheme of the Government of Kerala. As the total population of milk pourers who were DBT members was nearly two lakhs, a total sample size of 350 farmers was selected for the present study. The farmers/farm households were categorized into small or subsistence farms (1-3 cows), medium (4-10 cows) and large farms (more than 10 cows). Out of 350 farmers selected for the study the numbers of small, medium and large farms were fixed as 175, 100 and 75 respectively. A stratified multistage random sampling procedure was used to select the area of study and respondents. In the first stage, the state of Kerala was stratified into five agro-climatic zones (NARP, 1989). In the second stage one district from each zone (strata) was randomly selected. In the third stage, from each district two blocks were randomly selected. The sample size for each category of farms in each block was determined in proportion to the number of farmers belonging to each category (probability proportion to size technique). For this all the farmers in the selected blocks were enumerated and classified into small, medium and large farms based on number of cows. The respondents in each group were selected randomly in each block proportional to their number in each block. Details of sampling design are presented in Table 1.

Table 1: Distribution of samples selected for the study

Zone [a]	District	Blocks selected [b]	Small (n) [c]	Medium (n) [c]	Large (n) [c]	Total (n) [c]
South	Pathanamthitta	Parakode	12	5	2	19
		Pandalam	6	3	1	10
Central	Thrissur	Ollukkara	12	6	3	21
		Irinjalakuda	3	2	3	8
North	Palakkad	Kuzhalmannam	20	5	6	31
		Chittur	30	44	32	106
Problem Zone	Alappuzha	Haripad	6	5	3	14
		Veliyanad	2	2	3	7
High Range	Wayanad	Mananthavady	51	17	16	84
		Kalpetta	33	11	6	50
		TOTAL	**175**	**100**	**75**	**350**

[a]Agro-Climatic Zones in Kerala according to NARP, 1989; [b]Administrative blocks delimited by Government of Kerala; [c]Number of respondents

Primary data was collected using a pre tested questionnaire. Herd size was measured in terms of the number of various categories of cattle kept on the homestead. The actual number were converted into standard animals units

as per Kumbhare *et al*. (1983). The results were analysed using simple statistical tools like frequencies and percentage.

Results and Discussion

The compositions of herd maintained by different types of farmers observed in the study are presented in Table 2.

Composition of Herd Under Different Farm Sizes

The results indicated that out of the 23,611 dairy households enumerated in 10 blocks, small sized farms were predominant with a share of 83.80 per cent, followed by medium (15.62 per cent) and large farms contributed merely 0.58 per cent to the total. The average herd size calculated based on standard animal units were 3.13 $\pm$ 0.08, 9.52 $\pm$ 0.30 and 36.38 $\pm$ 3.65, in small, medium and large farms respectively. The overall herd size observed in the study was 12.08 $\pm$ 1.05. Report by Ghule *et al*. (2012) indicated that herd size in small (10.55) and medium farms (14.11) in Ahmed Nagar district of Maharashtra was higher while herd size in large farms (34.66) was marginally lower than that observed in the present study. Lactating animals were counted as 'in milk animals'. Milch animals included lactating cows and pregnant dry cattle excluding pregnant heifers. Irrespective of the size of farm, the proportion of milch animals remained dominant. All types of farms had essentially the same pattern of distribution of different categories of cattle.

Table 2: Composition of the herd in small, medium and large farms

Type of farm	In Milk	Dry	Milch	Heifer	Calf		Total	Herd size (Mean±SE)
					Female	Male		
Small* (N=175)	253 (43.40)	33 (5.66)	286 (49.06)	118 (20.24)	109 (18.69)	70 (12.01)	583	3.13±0.08
Medium* (N=100)	445 (46.70)	92 (9.65)	537 (56.35)	149 (15.63)	146(15.32)	121(12.70)	953	9.52±0.30
Large* (N=75)	1265 (50.02)	391 (15.46)	1656 (65.48)	291 (11.51)	439(17.36)	143(5.65)	2529	36.38±3.65
Overall* (N=350)	1963 (48.29)	516 (12.69)	2479 (60.98)	558 (13.73)	694(17.07)	334(8.22)	4065	12.08±1.05

**Figures in parenthesis indicate per cent to total; N= number of farms sampled*

Details of Sources of Finance

Details of sources of finance for purchase are presented in Table 3. Replacement of farm animals was observed to be an important aspect of dairy farming. Irrespective of farm size, the preferred mode of replacement was purchase of animals. Own finance appeared to be the dominant source of finance for animal purchase in all types of farms.

Table 3: Sources of finance for animal purchase

Finance for Purchase	Number & per cent	Small	Medium	Large	Total
Own finance	Number	105	63	59	227
	Per cent	60.00%	63.00%	78.70%	64.90%
Loan	Number	21	12	6	39
	Per cent	12.00%	12.00%	8.00%	11.10%
Own finance + Loan	Number	13	5	3	21
	Per cent	7.40%	5.00%	4.00%	6.00%
Subsidy Linked	Number	36	20	7	63
	Per cent	20.60%	20.00%	9.30%	18.00%

The farmers in general were reluctant to purchase heifers or calves. The overall picture showed that 68.3 per cent of farmers preferred purchase and 31.7 per cent preferred farm rearing for replacement of stock. The preference for purchase was highest in large farms and lowest in small farms. Results also indicated that irrespective of farm size,

direct purchase was the dominant option. On an average 64.9 per cent of the purchase used own finance and 18 per cent were linked to subsidy linked schemes with the rest being linked to loans. Relatively higher scheme linked animal purchase in small and medium segments were a reflection of government programmes promoting these categories.

Composition of Purchased and Farm Reared Animals

Composition of purchased and farm reared animals observed among different types of farms are presented in Table 4. In small, medium and large farms, 86.20, 96.0 and 96.65 per cent of the purchased animals respectively were adults. Among farm reared animals, calves formed the majority in all three types of farms.

Table 4: Distribution of purchased and farm reared animals in different types of farms

Farm size	Purchased animals				Farm reared animals			
	Adult	Heifer	Calf	Total	Adult	Heifer	Calves	Total
Small*	150 (86.20)	18 (10.35)	6 (3.45)	174	133 (35.19)	78 (20.63)	167 (44.18)	378
Medium*	336 (96.0)	11 (3.14)	3 (0.86)	350	204 (33.94)	141 (23.46)	256 (45.25)	601
Large*	1383 (96.65)	16 (1.12)	32 (2.23)	1431	253 (23.23)	275 (25.25)	561 (51.52)	1089
Overall	1869 (95.60)	45 (2.30)	41 (2.10)	1955	590.0 (28.53)	494.0 (23.89)	984 (47.58)	2068

**Figures in parenthesis indicate per cent to total*

Breed Preferences

Examination of breed preferences indicated that Crossbred Holstein Friesian (CBHF) animals were more likely to be purchased by farmers irrespective of the size of farm. In small farms, herds were composed of 37.7 per cent Crossbred Jersey (CBJ) and 62.3 per cent CBHF animals. In medium farms the respective figures were 35.0 and 65.0 per cent. Large farms had a high proportion of CBHF (86.7 per cent) and CBJ animals comprised only 13.3 per cent of the purchase. The overall figures were 31.7 and 68.3 per cent CBJ and CBHF respectively among purchased animals. The results disagree with findings by Prasad *et al.* (2017) from Wayanad district that more CBJ type animals were maintained by farmers.

Source of Purchase and Production Parameters of Animals

The trends observed in the present study with respect to source, production level, lactation number, stage of lactation and pregnancy status of such animals are presented in Table 5. Majority of animals purchased in all types of farms were lactating animals. The results showed that irrespective of farm size, more than 90 per cent of animals were in the first five lactation orders. In small farms majority (31.1 per cent) belonged to second order, followed by first (28.3 per cent) and third (21.1 per cent). The proportions were similar in medium farms. In large farms the majority of animals belonged to 2nd order followed by 3rd order and 1st order of lactation.

Farmers maintained animals as high as 8th lactation number. In small and medium farms majority of the animals belonged to the production level of 10-15 litres/day. In large farms, the majority of the animals purchased were having a production level of 15-20 litres/day. Report by Prasad *et al.* (2017) indicated that 66 per cent of animals produced between 10-15 litres/day in Wayanad district of Kerala, which was higher than that observed in this study. The discrepancy could be due to sampling variations. Higher proportion of farmers in Villupuram, Tamilnadu had milk production in the range of 6-10 litres/day (Tamizhkumaran and Rao, 2012). The proportions of farmers with high milk production were similar to report by Karthikeyan *et al.* (2018) from Namakkal district of Tamilnadu and Thakur *et al.* (2019) from Punjab. Results of present study agreed well with report by Prasad *et al.* (2019), considering the small-scale farmers, since majority of farmers (53.3%) had up to three dairy animals. However, the frequency of animals which yielded less than five litres of milk (4.17 %) and between five to ten litres (20.83 %) was higher than that observed in the present study. The results indicated that, irrespective of farm size majority of animals in all types of farms were within the first 100 days of lactation.

Table 5: Source, production level, lactation number, stage of lactation and pregnancy status of purchased animals in different types of farms

Parameter	Classification	Type of farm						Overall	
		Small		Medium		Large			
		N	%	N	%	N	%	N	%
Source of purchase	Within District	116	66.29	56	56	18	24	190	54.29
	Within State	6	3.43	4	4	0	0	10	2.85
	Outside State	53	30.29	40	40	57	76	150	42.86
Production (Litres)	01-May	2	1.14	0	0	0	0	2	0.57
	05-Oct	33	18.86	26	26	0	0	59	16.86
	Oct-15	63	36	37	37	20	26.67	120	34.29
	15-20	48	27.43	18	18	48	64	114	32.57
	>20	29	16.57	19	19	7	9.33	55	15.71
Lactation number	1	86	28.38	127	25.71	439	26.61	652	26.64
	2	94	31.02	160	32.39	496	30.06	750	30.65
	3	64	21.12	126	25.51	452	27.39	642	26.24
	4	44	14.52	55	11.13	136	8.24	235	9.6
	5	8	2.64	11	2.23	87	5.27	106	4.33
	6	2	0.66	7	1.42	31	1.88	40	1.63
	7	1	0.33	6	1.21	8	0.48	15	0.61
	8	4	1.32	2	0.4	1	0.06	7	0.29
Stage of lactation and pregnancy status	1- 100 days	91	23.33	165	23.57	444	20.15	700	21.26
	100-200 days	58	14.87	73	10.43	378	17.16	509	15.46
	200-300 days	59	15.13	175	25	309	14.03	543	16.49
	> 300 days	44	11.28	30	4.29	160	7.26	234	7.11
	Dry	31	7.95	86	12.29	370	16.8	487	14.79
	Pregnant	107	27.44	171	24.43	542	24.6	820	24.9

Age and Pregnancy Status of Heifers

Observations with regard to age and pregnancy status of heifers are presented in Table 6. The overall results showed that the average age of heifers were 20.49 months and 32.09 per cent heifers were pregnant.

Table 6: Age and pregnancy status of heifers in different types of farms

Farm Size	Average Age of Heifers(months)	No. of Pregnant Heifers	Total heifers	% of Pregnant Heifers
Small	20.11	39	118	33.05
Medium	21.65	47	149	31.54
Large	19.73	93	291	31.96
Overall	20.49	179	558	32.07

Distribution of Male and Female Calves

Age wise distributions of male and female calves observed in the study are presented in Table 7. Irrespective of farm size, majority of the male calves were below three months of age. In small and large farms most of the female calves were below three months of age. However, in medium farms, more female calves were observed to be between three and six months of age.

Table 7: Age profile of male and female calves in different types of farms

Parameter	Classification	Type of Farm					
		Small		Medium		Large	
		No.	%	No.	%	No.	%
Age of male calves (months)	below 3	26	37.14	65	53.72	79	55.24
	3 to 6	25	35.71	24	19.85	36	25.17
	6 to 12	18	25.71	28	23.14	28	19.58
	above 12	1	1.43	4	3.31	0	0
Age of female calves (months)	below 3	47	43.12	52	35.62	202	46.01
	3 to 6	39	35.78	56	38.36	135	30.75
	6 to 12	23	21.1	38	26.03	102	23.23

The results of the present study were in agreement with Varghese *et al.* (2000) who conducted a detailed investigation on herd profile of dairy farmers of Pathanamthitta district, Kerala. George and Nair (1990) in their study of livestock of economy of Kerala recorded the preference of farmers regarding production level of crossbred animals, breed preference, stage of purchase, cattle transaction, reason for transaction etc. Their findings were almost in agreement with the results of the present study except for few periodical changes.

Conclusion

The average herd size based on standard animal units were 3.13 $\pm$ 0.08, 9.52 $\pm$ 0.3 and 36.38 $\pm$ 3.65, in small, medium and large farms respectively. Irrespective of farm size the preferred mode of replacement was purchase of animals. Own finance (64.9%) appeared to be the most important source of finance in all farm segments. About 20% of the purchases were supported by government schemes in small and medium dairy farms. In small (36%) and medium farms (37%) majority of the animals belonged to the production level of 10-15 litres/day, while it was 15-20 litres/day in large farms (64%). Farmers maintained animals as high as 8^{th} lactation number. Crossbred Holstein Friesian animals were preferred by farmers irrespective of the size of farm. Irrespective of farm size majority of both male and female calves were below six months of age.

Acknowledgements

Support from Animal Husbandry & Dairy Development Department, Government of Kerala is gratefully acknowledged.

Conflict of Interests

There is no conflict of interest.

Publisher Disclaimer

IJLR remains neutral concerning jurisdictional claims in published institutional affiliation.

References

1. Economic review. (2019). Volume (1): state planning board, Government of Kerala. (2020, July 20). Retrieved from http://www.niyamasabha.org/codes/14kla/session_18/economic%20review_2019_volume%201_english.pdf
2. George, P. S. and Nair, K. N. (1990). Livestock economy of Kerala. Trivandrum, Kerala: Centre for development studies.
3. Ghule, A. K., Verma, N. K., Chauhan, A. K. and Sawale, P. (2012). An economic analysis of investment pattern, cost of milk production and profitability of commercial dairy farms in Maharashtra. *Indian Journal of Dairy Sciences*, 65(4), 329-36.

4. Karthikeyan, S., Arunmozhi, D. M. C., Narmatha, N., Uma, V. and Thirunavukkarasu, D. (2018). Profile of the dairy farmers and the constraints faced by them in utilizing different dairy service delivery systems. *International Journal of Agriculture Sciences*, 10(16), 7000-02.
5. KAU. (2010). Package of Practices Recommendations, Veterinary and Animal Husbandry (6th Ed.). Thrissur, Kerala: Kerala Agricultural University.
6. Kumbhare, S. L., Sharma, K. N. S. and Patel, R. K. (1983). Standardization of bovine units. *Indian J. Anim. Health*, 93: 457-550.
7. NARP (1989). National agricultural research project (ICAR) status report. Thrissur, Kerala: Kerala Agricultural University.
8. NDDB-National dairy development board statistics of milk production by states/UTs. (2020, April 8). Retrieved from https://www.nddb.coop/information/stats/milkprodstate
9. Prasad, K., Savale, S., Mahantesh, M. T., Pavan, M., Barman, D. and Abraham, J. (2017). Socio-economic profile and constraints faced by dairy farmers of Wayanad district, India. *International Journal of Current Microbiology and Applied Sciences*, 6(6), 870-74.
10. Prasad, N., Kumar, S. M., Pande, Y. K., Soni, S., Saha, N. C. and Arya, S. (2019). Socio-economic status and problems faced by dairy farmers of Sardhana block of Meerut district. *International Journal of Livestock Research*, 9(4), 120-28. DOI 10.5455/ijlr.20180724092907
11. Sastry, N. S. R. (2000). Regional considerations for appropriate livestock development strategies in India. *Journal of Indian Veterinary Association*, 5, 16-29.
12. Tamizhkumaran, J. and Rao, S. V. N. (2012). Why cultivation of azolla as cattle feed not sustainable? *Indian Journal of Dairy Sciences*, 65(4), 348-53.
13. Thakur, N., Singh, P., Kasrija, R. and Singh P. (2019). Relationship of daily milk production with incidence of transitional diseases in Punjab, *International Journal of Livestock Research*, 9(12), 70-74. DOI 10.5455/ijlr.20181221063554
14. Varghese, G., Mohanachandran, S. R. and George, K. P. (2000). Current trends in rural dairying. *In*: Small holder livestock production systems in developing countries- opportunities and challenges (Eds. CK Thomas and NSR Sastry) Proceedings of the International conference on small holds livestock production systems in developing countries- opportunities and challenges, Thrissur. pp.790-97.

****