



Adoption of dairy farming practices and productivity status of milch cows in the Union Territory of Puducherry

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ABSTRACT

Dairy farming plays a vital role in the sustainability of rural households particularly landless labourers. The study assessed the extent of adoption of dairy farming practices and production performance of milch cows based on the primary data collected from a field survey of 200 dairy farmers in U.T. of Puducherry. There was wide scale adoption for health care practices like FMD vaccination, deworming, ecto-parasitic control measures and breeding practices like AI. The feeding practices like use of mineral mixture, green fodder and compounded feed had low adoption rates. Awareness programmes on mineral mixture and feeding practices would enable farmers to get higher milk yield. Group farming for cultivation of green fodder in fallow lands and restoration of common grazing lands are suggested. In addition, training programs on green fodder cultivation with supply of high-yielding green fodder seeds/slips by the State Agriculture Department to dairy farmers owning land would encourage them to take up fodder cultivation. The Government may provide feed subsidies for concentrates to help farmers increase milk production. Veterinary infrastructure may be strengthened to ensure availability of sex-sorted semen to dairy farmers to have female calves. Awareness programmes on hygienic milk production with emphasis on udder hygiene would help to prevent mastitis and avoid economic loss. Regardless of economic status, all the farmers should be made eligible to avail subsidy for livestock insurance. Milk procurement prices of Cooperative Milk Society may be increased to enable dairy farmers realize more profit.

Keywords: Constraint analysis, Milk yield, Scientific dairy farming practices

Livestock farming is a potential avenue for employment and income generation in rural areas. The net receipts from farming of animals constitute 15.5% of total monthly income per agricultural household in rural India (NSSO 2019). India has the largest livestock population of 536 million in the world. The various initiatives of the Government have helped to enhance milk production from 132.4 million tonnes in 2012-13 to 230.6 million tonnes in 2022-23. However, the livestock sector is beset with challenges of outbreak of diseases, non-availability of improved breeds, lack of adequate infrastructure and technical manpower and intermediaries in the marketing of livestock and its products. Therefore, concerted efforts are required to overcome these challenges, as livestock has immense potential to contribute to the livelihood security of rural households.

The Union Territory of Puducherry has a livestock population of 151368 of which cattle constitute 47.55% and buffaloes 1.58% (20th Livestock Census of India). The total milk production in the state is 49650 MT with a per

capita availability of 85 gm/day against all-India average of 459 gm/day. The productivity per milk animal in the state is 5.80 kg/day for exotic/cross-bred cows and 2.51 kg/day for indigenous / non-descript cows and the respective all-India figures are 8.55 kg/day and 3.44 kg/day (BAHS 2023).

The production performance of livestock is influenced by the extent of adoption of farming practices. Jogonal *et al.* (2021) reported higher adoption levels for health care, followed by milking, breeding and feeding practices with low adoption for calf-rearing practices in the Rajkot district of Gujarat. Several factors like membership in cooperatives benefit farmers in terms of higher yield of dairy animals than non-members (Athare *et al.* 2019), and SHG members than non-SHG members (Ritu *et al.* 2020). Baban (2020) observed the positive impact of dairy farmers' participation in the District Cooperative Society on green fodder cultivation, AI adoption and feeding concentrates. Ram Niwas *et al.* (2021) identified water scarcity, climate and poor economic conditions as constraints to dairy farming in arid zone of Rajasthan. The present study was taken up to know the adoption levels of dairy farming practices and productivity of milch cows by a survey of 200 dairy farmers in the coastal districts of Puducherry and Karaikal in Puducherry U.T. to evolve strategies for higher yield and

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income from dairy farming in the study area.

MATERIALS AND METHODS

Study area and sampling: The U.T. of Puducherry encompasses Puducherry, Karaikal, Yanam and Mahe region. A multi-stage sampling method was adopted in the selection of sample dairy farmers. In the first stage, all five communes in Puducherry and six communes in Karaikal district were chosen for the study. The second stage involved selection of villages followed by random selection of 200 respondents in probability proportion to cattle population in the districts. Thus, a sample of 150 dairy farmers in Puducherry district and 50 dairy farmers in Karaikal district were selected for the study. Primary data was collected from sample respondents using pre-tested interview schedule to document the rearing practices adopted in dairy farms, productivity of milch cows and constraints in dairy farming. Survey was taken up during June–Sept 2022.

Analytical tools: Percentage analysis was used for the description of socio-economic profile of respondents and the adoption of dairy farming practices. Garrett’s ranking technique was used to identify the major production, technological, socio-economic and marketing constraints in dairy farming. The respondents were asked to rank the identified problems and ranks were transformed into percentage position using the formula:

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_{ij}}$$

Where; R_{ij} , Rank given for i^{th} factor by the j^{th} individual; N_{ij} , Number of factors ranked by the j -th individual. The percentage positions of each rank were converted into scores by referring to the table given by Garrett and Woodworth (1969). From the scores so obtained, the mean score was derived and constraints were ranked based on the mean score.

RESULTS AND DISCUSSION

Socio-economic profile of sample respondents: The socio-economic characteristics of dairy farmers influence decision-making ability and adoption of scientific practices in dairy farming, which is depicted in Supplementary

Table 1. Age reflects the ability of individuals to manage the dairy farm enterprise and deal with risks and uncertainties in dairy farming. In the sample, majority (65%) of the sample respondents were above 50 years of age and 71% had at least primary education. Therefore, age and education were not limiting factors for the adoption of dairy farming practices. Dairying was only a secondary occupation for 74.5% of the sample respondents while non-farm jobs were the primary source of income.

Land and livestock holding pattern of sample farms: Land holding pattern of sample farmers is depicted in Supplementary Table 2. Among the sample dairy farmers, 70% did not own land, while 28.5% were marginal and small holders operating 43.35% of the land area, and 1.5% belonged to medium land holding category operating 34.65% of the total land area of 66.97 ha. The dairy farms were exclusively white cattle farms. The total livestock inventory as presented in Supplementary Table 3. comprised of 206 milch animals, 43 heifers and 69 calves in Karaikal and it was 589 milch animals, 148 heifers and 329 calves in Puducherry. Overall, livestock was the major asset for 70% of the landless in the sample.

Livestock management practices adopted in the dairy farms: The adoption of management practices like proper housing, balanced feeding and veterinary care are required for good health and hygiene of cattle to obtain higher milk yield. The extent of adoption of livestock management practices are discussed here under:

Housing: Housing and rearing system in dairy farms is given in Supplementary Table 4. Most of the dairy farms were of the thatched type (66.5%) with mud floor (77%) and there were no proper drainage facilities in most of the cattle sheds, which suggests the need to create awareness on scientific housing system and hygienic handling of dairy animals in the study area. Regarding the rearing system, 62.5% adopted an extensive system with the grazing of cattle in their own fields and/or community grazing lands, 18% followed semi-intensive and 19.5% adopted stall fed intensive system. Grazing of cattle was common during January–September, and average grazing hours was three hrs/day in the sample farms.

Feeding: The quantity of feed and nutrients for dairy animals depends on various factors such as stage of

Table 1. Feeding practices adopted in the sampled farms

Particular	Karaikal (206)*	Puducherry (589)*	Overall (795)*
Feeding of cut grasses to animals	21 (42.00)	29 (19.33)	50 (25.00)
Balanced ration on the basis of milk production	31 (62.00)	125 (83.33)	156 (78.00)
Feeding of mineral mixture	0	0	0
Pregnancy allowances (1 kg extra)	49 (98.00)	120 (80.00)	169 (84.50)
Use of green fodder	5 (10.00)	30 (20.00)	35 (17.50)
Green fodder production at own farm	4 (8.00)	10 (6.67)	14 (7.00)
Compounded feed (mash/ordinary pellet/bypass pellet)	4 (8.00)	20 (13.33)	24 (12.00)
Feed with own concentrate ingredients	0	0	0
Total farms	50	150	200

*Total milch animals. Figures in parentheses indicate percentage to total farms.

Table 2. Health care practices adopted in the sample farms

Particular	Karaikal	Puducherry	Overall
Vaccination against infectious diseases			
Black Quarter (BQ)	0	83 (55.33)	83 (41.50)
Haemorrhagic Septicaemia (HS)	0	0	0
Foot and Mouth disease (FMD)	50 (100.0)	150 (100.0)	200 (100.0)
Brucellosis	0	0	0
Prompt reporting of outbreak of a contagious disease to local veterinarian	46 (92.00)	96 (64.00)	142 (71.00)
Treatment of sick animals by the veterinary doctor only	50 (100.0)	96 (64.00)	146 (73.00)
Isolation of sick animals from healthy ones in a separate house / shed / place	50 (100.0)	65 (43.33)	115 (57.50)
Control measures for ecto-parasites	48 (96.00)	128 (85.33)	176 (88.00)
Deworming of adult animals	50 (100.0)	147 (98.00)	197 (98.50)
Total farms	50	150	200

*Figures in parentheses indicate percentage to total farms.

lactation, the age of animal, level of physical activity, climatic conditions and season. Table 1 reveals that the widely adopted feeding practice was an additional 1 kg feed to pregnant dairy animals (84.5%) from mid-phase to end followed by the use of balanced ration on the basis of season and milk production (78%), cut grasses (25%), compound feed (12%) and only 7% raised fodder crop in their farms.

Health care: Adoption of health care practices helps to enhance productivity, prevent occurrence of diseases and mortality of animals. Table 2 reveals that there was 100% adoption for FMD vaccination due to the FMD vaccination programmes of Animal Husbandry Department organized free of cost twice a year. The deworming of adult animals, ecto-parasitic control measures, treatment of sick animals by veterinary doctor and prompt reporting of outbreak of contagious diseases to local veterinarian were other widely adopted health care practices in the sample farms.

Breeding: The respondents were small-scale producers and lack knowledge on scientific breeding practices. Table 3 reveals that all the dairy farmers adopted controlled system of breeding with Artificial Insemination (AI). The AI was done by veterinary doctors free of charge in the nearby Government Veterinary Dispensaries while they had to pay a nominal charge of ₹100/ animal when they take the cattle to private veterinary clinics. The farmers preferred to retain female calves while they sold male calves after

one year to traders for meat purposes and few were sold to other producers for breeding purpose. The dairy farmers reported that about 2-3 inseminations are required for successful pregnancy and all the dairy farmers were aware that pregnancy diagnosis had to be taken by 70 -80 days after AI. About 58% had their cows served within 60-90 days after calving, and 63.5% were aware of and treated for reproductive diseases by veterinary doctors. About 12% reported problems of infertility in herds and 11% reported dystocia in herds which may be due to negligence in supporting the animal nutritionally well.

Milking: Milking practices adopted in the sample farms is given in Supplementary Table 5. All the dairy farmers washed their hands before milking and many of them washed udder and teats before milking. Full-hand milking and stripping were the common methods of milking. None of the farmers adopted the bad practice of knuckling. Only 11% tested their cattle for mastitis. An awareness among dairy farmers on milking and milking practices would help to avoid contamination of milk during milking and after milking and to avoid mastitis that affects the economic benefits of dairy farming.

Calf management practices: Among the calf management practices as given in Supplementary Table 6, all the farmers practiced feeding colostrum to newborn calves within one hour of birth, and more than 80% of farmers cleaned the calves immediately after delivery

Table 3. Breeding practices adopted in the sample farms

Particular	Karaikal	Puducherry	Overall
Breeding method			
Artificial Insemination	49 (98.00)	150 (100.0)	199 (99.50)
Natural Service	1 (2.00)	0	1 (0.50)
Having cow served within 60-90 days after calving	19 (38.00)	97 (64.67)	116 (58.00)
Pregnancy diagnosis done 70-80 days after services	50 (100.0)	150 (100.0)	200 (100.0)
Treatment of reproductive disease by veterinarian	17 (34.00)	110 (73.33)	127 (63.50)
Proper disposal of placenta	50 (100.0)	150 (100.0)	200 (100.0)
Faced problem of dystocia	2 (4.00)	20 (13.33)	22 (11.00)
Occurrence of infertility in herd	7 (14.00)	17 (11.33)	24 (12.00)
Total farms	50	150	200

*Figures in parentheses indicate percentage to total farms.

Table 4. Details on calving and milk days in dairy cows

Particular	Karaikal	Puducherry
Age at first calving (yrs)	2.9	2.9
Inter-calving period (days)	540	520
Milk days (days)	240	280
Dry days (days)	125	85
Productive life period of animal (yrs)	7-8	7-8
Average milk yield (litres/day/cow)		
Morning	3.31	5.28
Evening	2.11	3.65
Total	5.42	8.93

and dewormed the calves regularly. About 49.5% adopted trimming of hooves, 38% used sterilized scissors / knife for removal of naval cord and application of tincture and 27.5% practiced disbudding of calves in their dairy farms.

Other livestock practices: About 34.5% of them maintained accounts and 37.5% purchased milch animals after verifying for milk yield and other parameters like number of lactations, age of animal and inter-calving period. Only 5.33% consulted veterinary officials while purchasing dairy animals.

Production performance of milch cows in sample farms: The inter-calving period and average daily milk yield are indicators of the production performance of milch cows. Table 4 reveals that the average milk yield was 5.42 litres/animal/day in Karaikal while it was high at 8.93 litres/animal/day in Puducherry district. The age at first calving was 2.9 years and inter-calving period was almost 1½ years which suggests that attention is required on breeding management. The average milk days in the entire sample ranged from 240–280 days. The productive life of an animal on an average was 7–8 years.

Constraint analysis: Constraints faced by farmers are given in Supplementary Table 7. The dairy farmers faced several constraints in production and marketing. The constraints were listed and respondents were asked to rank them based on the order of importance and major constraints were identified using Garrett's ranking technique. The constraint analysis revealed that non-availability of grazing land and lack of availability of green fodder were the major production constraints in dairy farming followed by inadequate veterinary services while the poor productivity of animals, inadequate knowledge about balanced feeding and lack of technical support at doorsteps were major technological constraints in both the districts. The lack of government support for dairy farming, high cost of concentrates and high wages for labour were the other major socio-economic constraints. The low price of milk obtained rank I (mean score of 68.44 in Karaikal and 67.06 in Puducherry) and lack of Cooperative Milk Societies in Karaikal (mean score of 62.2) and distance to Cooperative Societies in Puducherry (mean score of 54.96)

were the other major constraints in the marketing of milk.

The adoption of scientific dairy farming practices would ensure better health and productivity of milch animals. Paddy is the major crop grown in Kharif and Rabi in Puducherry U.T. which ensures availability of dry fodder. In addition, the availability of clean water and conducive climate indicate the potential for taking up dairy farming in the region. There was wide-scale adoption for health care practices like deworming, vaccination against FMD, breeding practices like AI and pregnancy diagnosis by 70–80 days after insemination, milking practices like washing hands before milking and calf management practices like the feeding of colostrum to new born calves. As reported by the sample respondents, non-availability of grazing land, lack of green fodder, poor productivity of animals, inadequate knowledge on balanced feeding, lack of government support and low sale price of milk were the major constraints in dairy farming. To enhance productivity, awareness programmes on mineral mixture and udder hygiene for mastitis prevention would help to avoid economic loss to dairy farmers. Subsidy for concentrate feeds by the Government and training programs on value addition of milk would help dairy farmers to realize higher earnings from dairy farming.

REFERENCES

- Athare P G, Ajay V, Malhotra R and Sendhil R. 2019. Economics of milk production in Pune district of Maharashtra: A comparative analysis. *Indian Journal of Dairy Science* **72**(6): 652–58.
- Baban B. 2020. Impact of District Cooperative Society on adoption of improved farm practices: A farm level experience in Assam. *Indian Journal of Agricultural Economics* **75**(1): 62–73.
- Garrett H E and Woodworth R S. 1969. *Statistics in Psychology and Education*, Vakils, Feffer and Simons Pvt. Ltd, Bombay.
- GOI. 2023. *Basic Animal Husbandry Statistics*, Ministry of Fisheries Animal Husbandry and Dairying, Department of Animal Husbandry and Dairying, New Delhi.
- GOI. 2019. *20th Livestock Census of India*, Ministry of Fisheries Animal Husbandry and Dairying, Department of Animal Husbandry and Dairying, New Delhi.
- Jogal K V, Trivedi S M and Lakhlani C D. 2021. Adoption of improved Animal Husbandry practices by dairy farmers. *Indian Journal of Animal Sciences* **91**(12): 1115–117.
- NSSO. 2019. *Situation Assessment of Agricultural Households and Land and Livestock Holdings of Households in Rural India*, Ministry of Statistics and Programme Implementation (MoSPI), National Statistical Office, New Delhi.
- Ram N, Charu S and Chandra P M. 2021. Constraints perceived by dairy farmer of arid zone of Rajasthan in adoption of improved Animal Husbandry practices. *International Journal of Livestock Research* **11**(2): 108–13.
- Ritu R, Ravinder M, Udita C and Rajendra J. 2020. A comparative study on economics of milk production among self-help groups members and non-members in Rajasthan. *Indian Journal of Animal Sciences* **73**(6): 592–99.