



Original Research

Adoption of Good Dairy Farming Practices among Commercial Dairy Farmers of Karnataka

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Abstract

The present study was carried out with the objective to measure adoption level of good dairy farming practices among commercial dairy farmers. The state Karnataka has been purposively selected due to its high milk production and development of commercial dairy farming as compared to other states of Southern India. In all, 135 respondents from 3 districts form the total sample size of the study having equal representation of small (10-20 milch animals), medium (21-40 milch animals) and large (>40 milch animals) commercial dairy farmers. Questionnaire was prepared on animal health, hygienic milking, animal feeding, animal welfare and environmental friendly practices according to "Guidelines on good dairy farming practices" by FAO (2014). The study shows that adoption of animal health practices, hygienic milking practices and environmental practices was medium level whereas adoption of animal feeding and animal welfare practices was high among commercial dairy farmers. The level of adoption of different good dairy farming practices was significantly different among small, medium and large farmers. The overall adoption of good dairy farming practices was medium and similarly it was found medium among small and medium farmers but it was found high among large farmers. The study also shows that education, occupation, herd size, annual income and extension agency contact were highly significant and positively correlated with adoption level of good dairy farming practices whereas livestock rearing experience, land holding, social participation and mass media exposure were significantly and positively correlated with adoption. The study further reveals that annual income, herd size, education and extension agency contact were the main contributing factors to adoption of good dairy farming practices.

Key words: Adoption, Commercial Dairy Farmers, Good Dairy Farming Practices, Karnataka

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Introduction

India is blessed with largest livestock population having 512.05 million livestock which includes 199.9 million cattle and 108.7 million buffaloes (GOI, 2012). Dairy farming is the main component within the livestock sector and helps to provide livelihood security to nearly 70 million Indian rural households through regular supply of milk, generating round the year employment, producing manure for enriching the soil fertility, utilization of crop residue and acts as the asset value (NDDB, 2015). It is also an important sub-sector of livestock production which contributes towards filling in the large demand-supply gap for milk and milk products in both peri-urban and urban centres (Gilliah *et al.*, 2012). The ever increasing population and increase in per capita income of the people is resulting in increased demand for high value foods like milk and milk products. The expected demand for dairy based food products will be doubled by 2020 (DAHD, 2015). Major portion of milk produced in India is in the hand of small-holder dairy farmers and who belong to marginal and landless category with low productivity. But, increasing livestock productivity is critical to economic growth and development in a country which can be achieved through the introduction of improved technologies and management systems. This calls for further efforts to be taken in increasing milk production and productivity of the dairy animals and categorical adoption level of the dairy owners in good dairy farming practices. Therefore, a study was undertaken to measure the adoption level of dairy owners in good dairy farming practices in Karnataka.

Material and Methods

The state Karnataka has been purposively selected due to its high milk production and development of commercial dairy farming as compared to other states of South India. The increase in milk demand and urbanization lead to startup of dairy business commercially in Karnataka state (Mali, 2013). Three districts namely Kolar, Chikkaballapura and Ramnagara were selected purposively due to its high milk production. These three districts are having a 613700 bovine female population out of which 492000 are cows and rest of animal are buffaloes (NDDB, 2015). Total milk production from these three districts is 436000 tonnes per annum out of which 298000 tonnes is from cross breed cows rest is from indigenous cattle and buffaloes (NDDB, 2015). These three districts were having 1900 cooperative societies with member strength of 226000. About 60% of milk is collected by milk co-operatives in this area (KMF, 2014). Fifteen respondents each from small (10-20 milch animals), medium (21-40milch animals) and large (>40 milch animals) dairy farms from three districts each were selected through stratified simple random sampling process. Thus, 45 respondents each from small, medium and large farmers and total 135 respondents form the sample size for the study. Data were collected through questionnaire by direct interview. To measure the adoption level of commercial dairy farming questionnaire was prepared on animal health, milking hygiene, animal feeding, animal welfare and environmental friendly practices by formulating questions



according to “Guidelines on good dairy farming practices” by FAO (2014). The degree of adoption was represented through score (i.e., complete adoption= 2, partial adoption= 1 and non-adoption= 0). The adoption scores for each respondent were then calculated by summing up all the scores obtained for each individual item. The maximum obtainable adoption score for different practices was as follows- animal health practices (36); hygienic milking practices (24); animal feeding (18); animal welfare (28); environmental practices (10) and thereby the overall maximum obtainable adoption score was 116. On the basis of obtained adoption score, the respondents were classified into three categories as low, medium and high level of adoption using range method. Analysis was done by using statistical tools such as frequency distribution, percentage, mean, standard deviation, Kruskal-Wallis test, Dunn-Bonferroni, correlation and regression using SPSS 20.0 and interpretation was drawn.

Result and Discussion

Adoption of Animal Health Practices

Table 1 reveals that average adoption rank score of commercial dairy farmers in animal health practices was medium (20.57). Similarly, average adoption rank score of small and medium farmers was medium but average adoption rank score of large farmers was high. Further, majority (63.70%) of the respondents had medium level of adoption followed by low (26.67%) and high (9.63%) level of adoption. Around 22 per cent of respondents from large farmers had high level of adoption whereas only 6.67 per cent from medium farmers and none from small farmers had high level of adoption. Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of animal health practices. Dunn-Bonferroni test was carried out for pair-wise comparison between the group and it shows the difference between each group was significant. Majority of respondents had adopted regular vaccination for FMD, HS and BQ, regular deworming and regular checking of animal for diseases because as discussed above they had knowledge in these practices. The practices like maintenance of treatment record, buying animal from known sources, regular sanitation, proper identification of animals and maintaining of vermin control program were moderately adopted by respondents because there is no awareness among majority of the respondents regarding these practices. Practices like strict quarantine measures, maintenance of animal affected with zoonotic diseases, isolation of sick animal and regular training for workers had not been adopted by majority of respondents as these practices cost extra financial burdens and also farmers are not concerned regarding these practices. More than half of the dairy farmers had regularly practiced timely and regular vaccination against contagious diseases like HS, BQ and FMD (Mali *et al.*, 2014). Majority of the dairy farmers had adopted segregation of diseased animal suffering from contagious diseases (Sachan *et al.*, 2016 and Mali *et al.*, 2014) but this finding was contradicted by

Gunaseelan *et al.* (2018) and Vekariya *et al.* (2016). Kumar *et al.* (2014) reported that majority of the respondents had adopted regular deworming and vaccination of animals.

Table 1: Average adoption rank score of each practices for animal health practice

S. No.	Practices	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
1.	Only buy animals of known disease status	1.68±0.46	1.84±0.36	1.88±0.38	1.80±0.41
2.	Following strict quarantine measures	0.80±0.40	1.02±0.33	1.51±0.54	1.11±0.52
3.	Fencing of farm	0.77±0.51	1.33±0.60	1.80±0.45	1.30±0.67
4.	Limit access to the outsider	0.93±0.57	1.20±0.50	1.62±0.49	1.25±0.89
5.	Maintaining vermin control program	0.92±0.63	1.08±0.59	1.46±0.54	1.16±0.61
6.	Using proper identification for animals	0.84±0.45	0.84±0.63	1.24±0.57	0.97±0.64
7.	Regular vaccination of animals	1.93±0.50	1.13±0.34	1.42±0.49	1.17±0.47
8.	Regular deworming of animals	1.66±0.25	1.86±0.34	1.77±0.51	1.85±0.39
9.	Regular checking of animals for diseases	0.86±0.25	1.88±0.31	1.93±0.25	1.82±0.43
10.	Isolating of sick animal from herd	0.31±0.52	1.40±0.45	1.66±0.47	1.49±0.54
11.	Keeping record of all treatment	0.17±0.23	0.97±0.54	1.28±0.62	1.04±0.55
12.	Managing animal affected with zoonotic diseases	0.23±0.23	0.46±0.56	0.86±0.62	0.54±0.59
13.	Using medicines according dosage	1.22±0.52	0.33±0.45	0.84±0.52	0.45±0.56
14.	Using only prescribed medicines by Veterinarians	0.86±0.25	1.13±0.39	1.15±0.47	1.17±0.48
15.	Storing & disposing medicines properly	0.71±0.21	1.02±0.40	1.20±0.54	1.02±0.51
16.	Using proper skills for treatment of animals	0.44±0.22	0.52±0.55	1.02±0.54	0.84±0.50
17.	Training all the workers in farm regularly	0.17±0.52	0.54±0.50	1.04±0.56	0.75±0.60
18.	Choosing competent source for training	0.18±0.45	0.46±0.12	0.6±0.53	0.41±0.50
Low (0-12)		16(35.56)	11(24.44)	9(20.00)	36(26.67)
Medium (12-24)		29(64.44)	31(68.89)	26(57.78)	86(63.70)
High (24-36)		0(0.00)	3(6.67)	10(22.22)	13(9.63)
Mean±SD		16.88±4.73	20.00±3.44	24.82±4.5	20.57±5.37
Kruskal-Wallis H value 50.577**					
Dunn-Bonferroni post hoc test [#]		A	B	C	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence;# Levels not connected by same letter are significantly different

Adoption of Hygienic Milking Practices

Average adoption rank score of hygienic milking practices was medium (15.02). Similarly, average adoption rank score of small and medium farmers group was medium but average adoption rank score of large farmers was high. Further, majority (57.04%) of respondents had medium level of adoption followed by low (38.50%) and high (4.44%). Majority (51.11%) of small farmers had low level of adoption but majority of medium (55.56%) and large (66.67%) farmers had medium level of adoption in hygienic milking practices (Table 2). Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of milking hygiene practices. Dunn-Bonferroni

test was carried out for pair-wise comparison between the group and it shows the difference between each group was significant. The practices like proper sanitation of milking utensils, proper washing of udder, cleaning of milking area and using of consistent milking techniques were completely adopted by majority of respondents because the co-operatives which received milk from these respondents followed strict regulation regarding quality of milk. Further, Department of Animal Husbandry created awareness among farmers regarding good quality of milk production on regular basis. Majority of respondents had partially adopted the practices like regular maintenance of milking records, separate milking of sick animal and personal sanitation of milker. Majority of respondents didn't have milking machine due to financial constraints and also irregular supply of electricity to rural areas. The practices like proper cooling of milk, maintaining storage temperature and proper storage of milk for longer time were not adopted by majority of respondents because they usually supply their milk immediately to the co-operatives after milking.

Table 2: Average adoption rank score of each practices for hygienic milking

S. No.	Practices	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
1.	Uniquely identifying of all animals	1.00±0.36	1.17±0.38	1.55±0.50	1.24±0.48
2.	Proper washing of udder before milking	1.91±0.28	1.95±0.20	1.84±0.42	1.90±0.32
3.	Following consistent milking techniques	1.77±0.47	1.84±0.36	1.86±0.34	1.82±0.39
4.	Separate milking of sick animals	1.06±0.33	0.95±0.42	1.53±0.50	1.13±0.49
5.	Proper using of milking equipment	1.04±0.46	1.31±0.55	1.68±0.55	1.15±0.61
6.	Using of clean water for milking	1.37±0.80	1.55±0.65	1.66±0.47	1.20±0.66
7.	Maintaining farm hygienically at all time	1.13±0.34	1.06±0.33	1.42±0.79	1.75±0.66
8.	Cleaning of milking area properly	1.75±0.52	1.80±0.40	1.71±0.50	1.40±0.42
9.	Following proper hygienic measures by milker	0.24±0.34	0.42±0.55	0.53±0.54	0.61±0.48
10.	Cooling milk in the specified time	0.17±0.44	0.91±0.54	0.75±0.64	0.65±0.56
11.	Proper cleaning of milk storage area	0.06±0.33	0.73±0.55	0.81±0.52	0.34±0.63
12.	Maintaining of temperature in storage	0.02±0.14	0.57±0.61	0.42±0.58	0.32±0.44
Low (0-8)		23(51.11)	18(40.00)	11(24.44)	52(38.52)
Medium (8-16)		22(48.89)	25(55.56)	30(66.67)	77(57.04)
High (16-24)		0(0.00)	2(4.44)	4(8.89)	6(4.44)
Mean±SD		12.57±2.91	15.31±2.09	17.17±2.79	15.02±3.22
Kruskal-Wallis H value 51.897**					
Dunn-Bonferroni post hoc test [#]		A	B	C	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence; # Levels not connected by same letter are significantly different

Majority of the respondents had always adopted cleaning of udder before milking and use of full hand method of milking while sometimes adopted washing the dairy animals before milking, cleaning of utensils

(Surkar *et al.*, 2014 and Sachan *et al.*, 2016). Majority of the dairy farmers were keeping the shed clean at the time of milking (Vekariya *et al.*, 2016).

Adoption of Animal Feeding Practices

The average adoption rank score of animal feeding practices was high (12.45). Similarly, average adoption rank score of medium and large farmers was high but average adoption rank score of small farmers was medium. The study further shows that majority (53.33%) of respondents had medium level of adoption followed by low (37.04%) and high (9.63%) level of adoption (Table 3).

Table 3: Average adoption rank score of each practices for animal feeding

S. No.	Practices	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
1.	Ensuring the nutritional needs of animals	1.97±0.14	1.93±0.25	2.00±0.00	1.97±0.17
2.	Providing good quality of feed and water	1.80±0.40	1.82±0.38	1.91±0.28	1.84±0.36
3.	Using of different utensil for chemical & feed.	1.40±0.53	1.68±0.51	1.82±0.44	1.63±0.52
4.	Proper use of chemicals for crops	0.91±0.28	1.02±0.33	1.51±0.54	1.14±0.48
5.	Using approved chemicals for treatment of feed	0.73±0.49	0.86±0.45	1.17±0.57	0.92±0.54
6.	Separate feed intended for separate species	1.40±0.49	1.24±0.43	1.44±0.50	1.36±0.48
7.	Proper storage of feed	1.60±0.53	1.77±0.42	1.86±0.34	1.74±0.45
8.	Proper handling of mouldy feed	1.02±0.75	1.37±0.38	1.60±0.61	1.33±0.72
9.	Maintaining records of all feed	0.13±0.34	0.57±0.25	0.73±0.57	0.48±0.54
Low (0-6)		22(48.89)	17(37.78)	11(24.44)	50(37.04)
Medium (6-12)		21(46.67)	24(53.33)	27(60.00)	72(53.33)
High(12-18)		2(4.44)	4(8.89)	7(15.56)	13(9.63)
Mean±SD		10.97±2.38	12.31±2.11	14.60±2.08	12.45±2.52
Kruskal-Wallis H value 32.393**					
Dunn-Bonferroni post hoc test [#]		A	B	C	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence; # Levels not connected by same letter are significantly different

Majority of the large farmers (60%) and medium farmers (53.33%) belonged to medium level of adoption whereas majority of small farmers (48.89%) belonged to low level of adoption. Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of animal feeding practices. Dunn-Bonferroni test was carried out for pair-wise comparison between the group and it shows the difference between each group was significant. Majority of respondents had completely adopted practices like providing good quality of feed and water, using of separate utensils for feed and chemicals and providing proper storage of feed. Practices like using approved chemicals, proper use of chemicals for crop and proper handling of mouldy feeds were partially adopted. Practices like regulated use of chemicals in agriculture and record keeping for feed and fodder was not adopted by majority of respondents might be due to lack of knowledge about those practices. Majority of the dairy

farmers were feeding concentrate mixture on the basis of milk production (Gunaseelan *et al.*, 2018). Majority of the dairy farmers had medium level of adoption in feeding management (Sachanet *et al.*, 2016).

Adoption of Animal Welfare Practices

The average adoption rank score of animal welfare practices was high (19.99). Similarly, average adoption rank score of medium and large farmers was high but average adoption rank score of small farmers was medium. The study further shows that majority (64.44%) of respondents belonged to medium adoption level followed by low (20%) and high (15.56%) adoption level (Table 4).

Table 4: Average adoption rank score of each practices for animal welfare

S. No.	Practices	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
1.	Providing sufficient feed and water every day	1.81±0.14	1.97±0.14	1.98±0.20	1.97±0.23
2.	Providing supplementary feed to animals	1.68±0.46	1.82±0.38	1.95±0.25	1.82±0.42
3.	Protecting animals from toxic plants	1.13±0.50	1.37±0.53	1.68±0.12	1.40±0.12
4.	Proper designing of farm shed	1.75±0.43	1.71±0.45	1.84±0.54	1.77±0.56
5.	Providing adequate space for each animals	1.46±0.50	1.53±0.54	1.68±0.36	1.54±0.23
6.	Protecting from adverse weather condition	1.26±0.49	1.35±0.48	1.62±0.41	1.41±0.12
7.	Providing proper ventilation	1.51±0.50	1.60±0.53	1.48±0.23	1.60±0.12
8.	Maintaining of non-slippery floor	1.04±0.56	1.20±0.44	1.53±0.25	1.24±0.52
9.	Treating lameness properly	1.22±0.51	1.17±0.50	1.82±0.42	1.31±0.41
10.	Regular milking of lactating animals	1.82±0.38	1.80±0.40	1.46±0.52	1.44±0.36
11.	Protecting animal from injuries	1.40±0.53	1.22±0.58	1.20±0.36	1.22±0.24
12.	Following proper calving and weaning practices	0.95±0.42	0.75±0.59	0.86±0.21	0.77±0.26
13.	Maintaining competent animal husbandry skills	0.71±0.50	0.68±0.43	0.80±0.21	0.73±0.32
14.	Following proper herd management practices	0.71±0.50	0.68±0.51	0.67±0.23	0.61±0.21
Low (0-10)		11(24.44)	8(17.78)	8(17.78)	27(20.00)
Medium (10-19)		32(71.11)	28(62.22)	27(60.00)	87(64.44)
High (19-28)		2(4.44)	9(20.00)	10(22.22)	21(15.56)
Mean±SD		18.66±3.36	19.68±3.07	21.62±2.70	19.99±3.27
Kruskal-Wallis H value 17.106**					
Dunn-Bonferroni post hoc test [#]		A	A	B	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence; # Levels not connected by same letter are significantly different

Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of animal welfare practices. Dunn-Bonferroni test was carried out for pair-wise comparison between the group and it shows the difference was significant between small and medium farmers from large farmers with respect to animal welfare practices. The animal welfare practices were much better in the large farms. The adoption of animal welfare practices among the small and medium farmers did not differ significantly. Majority of respondents had completely adopted practices like providing sufficient quantity of water to animal regularly, regular milking of lactating animals, maintaining

of non-sleeper floor, protecting animal from adverse weather condition and providing sufficient ventilation to animals and following proper calving and weaning practices regularly. Majority of respondent were aware about these practices as they believe that these practices directly influenced the economic viability of dairy animals. The practices like following proper herd management practices and following competent animal husbandry skill were moderately adopted by majority of respondents. Animal welfare is an important factor which contributes to the productive and reproductive performance of the animal (FAO, 2014).

Adoption of Environmental Practices

The average adoption rank score of environmental practices was medium (5.90). Similarly, the average adoption rank score of different categories of dairy farmers group were also medium. Majority (53.33%) of respondents belonged to medium level of adoption followed by low (41.48%) and only high (5.19%) level of adoption. Majority of large (60%) and medium (55.56%) farmers had medium level of adoption whereas majority of small farmers (55.56%) had low level of adoption (Table 5).

Table 5: Average adoption rank score of each practices for environmental safeguard

S. No.	Practices	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
1.	Storing waste in proper manner to minimize the risk of environment pollution	0.71±0.39	0.72±0.50	0.81±0.50	0.76±0.23
2.	Managing pasture to avoid effluent runoff by spreading farm manure	0.80±0.23	0.89±0.23	0.78±0.23	0.80±0.21
3.	Using chemicals appropriately to avoid contamination of the local environment	0.92±0.21	0.86±0.21	0.82±0.56	0.74±0.34
4.	Managing dairy run-off on farm	1.02±0.82	1.23±0.36	1.34±0.23	1.22±0.42
5.	Following eco-friendly practices	0.53±0.23	0.51±0.12	0.71±0.52	0.64±0.21
Low (0-4)		25(55.56)	17(37.78)	14(31.11)	56(41.48)
Medium (4-7)		20(44.44)	25(55.56)	27(60.00)	72(53.33)
High (7-10)		0(0.00)	3(6.67)	4(8.89)	7(5.19)
Mean±SD		5.33±1.47	6.15±1.78	6.44±1.82	5.90±1.75
Kruskal-Wallis H value 9.885**					
Dunn-Bonferroni post hoc test [#]		A	A	B	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence; # Levels not connected by same letter are significantly different

As per the report of MoEF (2015) in India farmers were least concerned about environment protection. Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of environmental practices. Dunn-Bonferroni test was carried out for pair-wise comparison between the group and it shows the difference was significant between small and medium farmers from large farmers with respect to adoption of environmental practices. Majority of the respondent

had moderately adopted practices like storing of wastes in proper manner, managing pasture to avoid effluent run off and using chemicals appropriately to avoid contamination of environment. The eco-friendly practices were not completely adopted by majority of the respondents, might be due to lack of knowledge in these practices.

Overall Adoption of Good Dairy Farming Practices

The overall average adoption rank score of good dairy farming practices was medium (73.99). Similarly, overall average adoption rank score of small and medium farmers was medium but average adoption rank score of large farmers was high. Further, majority (51.11%) of respondents had medium level of adoption followed by low (32.59%) and high (16.30%) level of adoption. Majority of small (53.33%), medium (46.67%) and large (53.33%) farmers had medium level of adoption (Table 6).

Table 6: Distribution of respondents according to their adoption level on different dairy farming practices

Level of Adoption	Small Farmers (n=45)	Medium Farmers (n=45)	Large Farmers (n=45)	Pooled (N=135)
Low (0-39)	19(42.22)	15(33.33)	10(22.22)	44(32.59)
Medium (39-77)	24(53.33)	21(46.67)	24(53.33)	69(51.11)
High (77-116)	2(4.44)	9(20.00)	11(24.44)	22(16.30)
Mean±SD	64.33±11.62	73.47±7.54	84.18±10.07	73.99±12.75
Kruskal-Wallis H value 59.992**				
Dunn-Bonferroni post hoc test [#]	A	B	C	

Figures in the parenthesis indicate percentage; **Significant at 0.01 level of confidence; # Levels not connected by same letter are significantly different

Kruskal-Wallis test shows a very strong evidence to suggest a difference between at least one pair of groups with respect to adoption of good dairy farming practices. Dunn-Bonferroni test was carried out for pair wise comparison between the group and it shows the difference between each group was significant. Thus, this study have proved evidently that adoption of good dairy farming practices was more among large farmers compared to medium and small farmers. Majority of dairy farmers had medium level of adoption in scientific dairy farming practices (Satyanarayan and Jagadeeswary, 2010 and Sachan *et al.*, 2016).

Relationship of Socioeconomic and Psychological Variables with Adoption

Table 7 shows that education, occupation, herd size, annual income and extension agency contact were highly significant and positively correlated with adoption level of good dairy farming practices whereas livestock rearing experience, land holding, social participation and mass media exposure were positively and significantly associated with adoption. The results are in concurrence with findings of Gunaseelan *et al.* (2018) and Vekariya *et al.* (2016).

**Table 7:** Spearman correlation of socioeconomic and psychological variables with adoption

S. No.	Variables	Spearman Correlation
1.	Age	0.391
2.	Education	0.118**
3.	Occupation	0.311**
4.	Livestock rearing experience	0.238*
5.	Land holding	0.201*
6.	Herd size	0.352**
7.	Annual income	0.368**
8.	Social participation	0.235*
9.	Extension agency contact	0.617**
10.	Mass media	0.391*

** $p < 0.01$, * $p < 0.05$ **Contributing Factors to Adoption**

Table 8 revealed that 64 per cent of variability in adoption of good dairy farming practices was explained by annual income, herd size, education and extension agency contact. The study reveals that annual income, herd size, education and extension agency contact were the main contributing factors to adoption of good dairy farming practices. It may be concluded that farmers with higher annual income, herd size, education and extension agency contact were having higher adoption of good dairy farming practices.

Table 8: Multiple regression analysis of adoption with some socioeconomic and psychological variables

Socio-economic characters	Regression Coefficient (b)	't' value
Education	0.17	3.881*
Herd size	0.708	1.456*
Annual income	6.943	4.863**
Extension agency contact	1.243	1.027*

 $R^2 = 0.647$, ** $p < 0.01$, * $p < 0.05$ **Conclusion**

Adoption is the mental process through which an individual passes from hearing about an innovation to final adoption. The study has indicated that large commercial dairy farmers have high level of adoption in good dairy farming practices but continuous interventions need to be taken up for the small and medium commercial dairy farmers so that the adoption level of these farmers can be enhanced. To do that, the extension agencies working in the study area need to disseminate knowledge in respect to breeding, feeding, healthcare, hygienic milking, animal management and welfare and environmental friendly practices in scientific dairy farming practices targeting more on small and medium commercial dairy farmers so that they can adopt these technologies and can achieve the desired goal of enhancing the production and productivity of the commercial dairy farms.



References

1. DAHD Annual Report. 2015-16. Animal Husbandry, [dahd.nic.in/.../Report%202015016%28English%...: 19-42.](http://dahd.nic.in/.../Report%202015016%28English%...)
2. Food and Agriculture Organization (FAO). 2014. Guidelines for good dairy farming practices. www.fao.org.in
3. Gillah KA, Kifaro GC and Madsen J. 2012. Urban and peri urban dairy in East Africa: A review on production levels, constraints and opportunities. *Livestock Research for Rural Development*, 24(11), Article #198. <http://www.lrrd.org/lrrd24/11/gill24198.htm>
4. Government of India (GOI). 2012. Livestock census-2012, www.livestockcensus.goi.in/2012
5. Gunaseelan M, Thilakar P, Mathialagan P. and Serma Saravana Pandian A. 2018. Adoption level of improved dairy farming technologies by peri-urban dairy farmers in Thanjavur district of Tamil Nadu. *International Journal of Livestock Research*, 8(1), 103-111. <http://dx.doi.org/10.54555/ijlr.20170805093320>
6. Karnataka Milk Federation (KMF). 2014. Karnataka Milk Federation achievements. <https://kmfnandini.coop>.
7. Kumar S, Jain A and Gupta AK. 2014. Studies on breeding, health care and milking management practices adopted by the dairy owners in Shahdol district of MP, India. *International Research Journal of Biological Sciences*, 3(10), 32-36
8. Mali KN. 2013. A comparative study on dairy and non-dairy farmers in Belgaum district. MSc. Thesis submitted to UAS, Dharwad. Pp 84.
9. Mali KN. 2014. A Study on knowledge and adoption of dairy farmers about improved dairy management practices. *Agriculture Update*, 9(3), 391-395.
10. MoEF. 2015. Control of Pollution. MoEF Annual report. 2014-15, www.moef.nic.in/report/report.html: 96-101.
11. National Dairy Development Board (NDDB). 2015. Annual report 2014-15. Increasing the production of milk in India. www.nddb.org.in
12. Sachan R, Sankhala G, Roy R and Manjusha J. 2016. Adoption level of recommended buffalo husbandry practices by dairy farmers in Uttar Pradesh. *Indian Journal of Dairy Science*, 69(5), 613-617
13. Satyanarayan K and Jagadeeswary V. 2010. A study on knowledge and adoption behaviour of livestock farmers. *Indian J. Animal Res.*, 44 (2), 100-106.
14. Surkar SH, Sawarkar SW, Kolhe RP and Basunathe VK. 2014. Adoption of quality milk production practices by dairy farmers in Wardha district of Maharashtra. *Agriculture and Rural Development International*, 1(1), 1-4.
15. Vekariya SJ, Kumar R, Chaudhari GM, Savsani HH and Swaminathan B. 2016. Factors influencing the adoption of scientific animal husbandry practices: A case of Saurashtra in Gujarat. *Advances in Life Sciences* 5(16), 6018-6024