Adoption of Dairy Farming Technologies by Livestock Farmers

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ABSTRACT

Keeping in mind the role of external factors affecting adoption behavior of dairy farmers, a study was conducted in Bangalore rural district of Karnataka with the objective to analyze adoption of scientific farming practices by dairy farmers. Primary data were collected from 180 farmers from Antarahalli and Koira villages using random sampling method. Semi structured interview schedule was used to collect the data, using personal interview. Herd size, occupation, and social participation with the adoption were positively correlated and family education level of the respondent was highly positively correlated with adoption, while farm size was negatively correlated with adoption. Based on the results, it is concluded that the majority of livestock owners had medium level of adoption behavior with respect to dairy farming technologies. Information input and output, farmer intra-system communication, farmer-researcher communication, farmer-extension agent communication, availability of input facilities and overall knowledge level about dairy farming technologies had positive and highly significant relationship with overall adoption of dairy farming technologies by livestock owners.

Key words: *Adoption; Communication; Dairy farming;*

Dairying is a major occupation in rural India providing substantial employment and income. It acts as a means to supplement the income of the poor households to ensure stable income. In India, government introduced several programmes to improve the status of dairy farming. Dairy farming has become a commercial enterprise now and helps farmers to improve their economic condition. India's milk output during the year 2007-08 reached the level of 102 million tonnes, providing per capita availability of 246 g per day (*Bhasin, 2009*). This has not only placed India on top in the world but it also represents sustained growth in the availability of milk and milk products for the burgeoning population of the country. Dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities.

Various established organizations like universities, research stations, state directorates of animal husbandry and livestock extension services act at different levels in order to generate and transfer the technologies amongst livestock farmers. Despite these efforts adoption of recommended technologies in dairy farming sector has not been as widespread as it was anticipated. While reviewing the adoption research, *Loganandhan and Singh (2003)* reported that adoption behavior of farmers is influenced by their socio-economic characteristics such as education, land holding, social participation and communication skills etc. in organic farming practices. The reason for poor adoption of dairy farming technologies amongst livestock farmers all over the world is not fully understood. Keeping this in view a study was conducted with the specific objective to study the extent of adoption of animal feeding practices by the farmers as well as study the factors associated with adoption of dairy farming technologies.

METHODOLOGY

The study was conducted in Bangalore rural district of Karnataka. Primary data were collected from thirty three farmers from Antarahalli and Koira villages. The sampling method followed was random sampling. Semi structured interview schedule was used to collect the data, using personal interview method. In all, 180

respondents were finally selected for the study. The respondents were further categorized into large and small farmers based on the herd size (criteria of Mean + SD used).

The socio personal traits and communication variables of livestock farmers were taken as independent variables for the study purpose. Adoption of dairy farming technologies was the dependent variable. Artificial Insemination in cattle, Vaccination against Contagious Disease, Feeding Green Fodder, Feeding Concentrate and Common Dairy Farming Technologies were technologies considered in the present study. To determine the different levels of adoption of dairy farming technologies amongst livestock farmers, the described process in which detailed in the research by *Nell (1998)* was used in modified form. According to *Nell(1998)* adoption of dairy farming technologies was studied at two levels, Individual and overall adoption behavior, respectively. To study adoption level of each individual, livestock farmers were categorized as adopters and non-adopters. Then according to scores obtained by each individual, adopters were categorized into three groups as partly (score 1), to some extent (score 2) and fully (score 3). The summation of scores of respondents over these technologies plus score of 8 common dairy farming technologies was the overall adoption score of livestock owners in dairy farming technologies.

The overall adoption level of livestock farmers formed the basis for the categorization of respondents as high, medium and low level of adoption behavior in respect of dairy farming technologies. Variety of statistical techniques like frequency distribution, percentage, means, standard error, T-test, product moment correlation and multiple regression analysis were used to analyze the data.

RESULTS AND DISCUSSION

Adoption of artificial insemination : About 45 percent of farmers did not adopt AI and get their animals artificially inseminated, followed by 27.92, 22.73 and 4.55 per cent farmers who were found falling in partly, fully and to some extent category of artificial insemination adoption respectively (Table 1). This means that artificial insemination is not fully adopted as a new technology by dairy farmers. Similar results are reported by *Chand et al. (2001).*

Adoption of Vaccination against diseases : On the whole, it could be noticed that 14.29 per cent of farmers did not adopt vaccination against contagious diseases, whereas 65.58 per cent of farmers adopted fully, 16.23 per cent to some extent and only 3.20 per cent of farmers partly adopted vaccination against contagious diseases in their dairy animals (Table 1). The fact that about 6 per cent of farmers adopted fully, indicates that farmers are aware of the benefits of vaccination or may be expect for a free of cost operation.

Table1. Distribution of farmers based on adoption of technologies (N=180)

Adoption of Technologies	Adoption Level	No.	%
Adoption of A.I.	Partly	43	27.92
	To Some Extent	7	4.55
	Fully	35	22.73
	Non-Adopters	69	44.80
Adoption of Vaccination	Partly	6	3.90
	To Some Extent	25	16.23
	Fully	101	65.58
	Non-Adopters	22	14.29
Adoption of Feeding green fodder	Partly	6	3.90
	To Some Extent	143	92.85
	Fully	0	0
	Non-Adopters	5	3.25
Adoption of feeding concentrates	Partly	28	23.38
	To Some Extent	50	18.18
	Fully	50	25.97
	Non-Adopters	36	32.47

Adoption of feeding nutritious green fodder : None of the farmers were found belonging to category of complete adoption of feeding nutritious green fodder to their dairy animals. This high level of adopters for this technology is an indication that farmers are willing to adopt this relatively cheap technology.

Adoption of feeding concentrate : As evident from Table 1, the 23.38 per cent of farmers did not adopt feeding concentrate to their dairy animals, whereas among adopters, 32.47, 25.97 and 18.18 per cent farmers adopted fully, to some extent and partly feeding concentrate to their animals, respectively.

Adoption of common dairy farming technologies : The farmers were asked whether they adopted some of the recommended common dairy farming technologies on their farm or not. The results pertaining to this are presented in Table 2 which clearly indicates that nearly three-fourth of farmers adopted mineral mixture feeding to their milk cows, while about 96 per cent of them did not adopt silage making and it's feeding to their cows. It could further be seen that 8.44 per cent of farmers had

Table 2. Frequency Distribution of Farmers as per their Adoption of Common Dairy Farming Technologies dairy animals (N=180)

Adoption of Technologies	Adopted		Non-adopted	
	No.	%	No.	%
Mineral Mixture Feeding	115	74.86	39	25.32
Silage Making and Feeding	06	3.89	148	96.11
Enriching quality of Dry Fodder by urea treatment.	13	8.44	141	91.56
Urea-Molasses Mixture	01	0.65	153	99.35

Table 3. Frequency distribution of farmers as per their overall adoption of dairy farming technologies (N=180)

Adoption score	No.	%
Low (<8)	28	18.18
Medium (8-14)	91	59.09
High (>14)	35	22.73

Table 4. Mean values of adoption of dairy farming technologies in two category of respondents (N=180)

Variable (Adoption behavior)	Mean Values		't' Values
	Small farmers (n=90)	Large farmers (n=90)	
Adoption of AI	0.770	1.313	2.900**
Adoption of vaccination	4.189	5.175	2.892**
Adoption of FNGF	1.878	1.987	1.919
Adoption of feeding concentrate	1.716	1.612	0.550
Overall adoption of CDFT	10.149	12.563	3.893**

**P <0.01

adopted technology of enriching quality of dry fodder by urea treatment. The percentage of adopters was very low in the case of urea-molasses mixture.

Overall adoption of common dairy farming technologies : Majority of farmers (59.09%) were found belonging to medium level of adoption behavior, followed by 22.73 percent and 18.18 percent farmers with high and low level of adoption behavior in respect of dairy farming technologies viz. artificial insemination, vaccination against contagious diseases, feeding nutritious green fodder, feeding concentrate and common recommended dairy farming technologies (Table 3).

Differences in adoption by two category of respondents: It is amply clear from the Table 4 that highly significant (P<0.01) difference was observed in the mean values of adoption of artificial insemination and vaccination against contagious diseases between large farmers and small farmers. Adoption of AI in cattle and vaccination of animals against contagious diseases was found to be significantly higher amongst large farmers as compared to small farmers.

However, no significant difference was observed in the mean scores of adoption of feeding nutritious green fodder as well as feeding concentrates between small and large farmers. Mean values of the overall adoption of dairy farming technologies of both categories of farmers differed highly and significantly (P<0.01).

Relationship of adoption of dairy farming technologies and other independent variables:

Adoption of artificial insemination : It is clear from Table 5 that the information input, farmer-extension agent (F-E) Communication, educational level, knowledge level about AI and overall knowledge level about dairy farming technologies had positive and highly significant relationship (P<0.01) with adoption of AI.

Further perusal of Table 5 indicates that information output, F-R communication, family education statues, availability of input facilities and knowledge level about VACD had positive and significant (P<0.05) relationship with adoption of AI. All other remaining variables, including farmer intra-system communication, age family size, land holding, herd size, attitudes towards dairy farming, knowledge level about FNGF and knowledge level about CF had no significant relationship with adoption of AI among farmers.

Adoption of vaccination against contagious disease: Table 5 shows a clear picture about adoption of VACD. Information output, farmer Intra-system communication, educational level, knowledge about VACD, knowledge level about FNGF and overall knowledge level about dairy farming technologies had positive and highly significant relationship with adoption of VACD.

Further examination of results indicate that F-R communication had positive and age had negative but significant relationship (P<0.05) with adoption of VACD. All other remaining variables, including information input, F-E communication, family size, family education status, land holding, herd size, availability of input facilities, attitudes towards dairy farming, knowledge level about AI and knowledge level about concentrate feeding did not show any significant relationship with adoption of VACD among farmers.

Table 5. Correlation of adoption of dairy farming technologies and independent variables (N=180)

Variables	Overall adoption 'r'	Adoption of CF 'r'	Adoption of FNGF 'r'	Adoption of VACD 'r'	Adoption of A1 'r'
Information Input	0.57**	0.35**	0.03	0.07	0.25**
Information Output	0.51**	0.30**	0.09	0.33**	0.19*
Farmers Intra-system-Communication	0.34**	0.09	0.21*	0.28**	0.17
F-R Communication	0.33**	0.18	0.00	0.20*	0.208
F-E Communication	0.48**	0.24*	0.12	00.16	0.27*
Age	-0.27**	-0.08	-0.06	-0.21*	-0.05
Education	0.34**	0.04	0.02	0.30**	0.25**
Family Size	0.09	0.11	0.11	0.13	-0.07
Family Educational Status	0.21*	0.20*	0.15	0.12	0.20*
Land Holding	0.14	0.11	-0.0.3	0.04	0.04
Herd Size	0.10	0.05	0.03	0.07	-0.16
Availability of Input Facilities	0.36**	0.39**	0.13	0.12	0.19*
Attitudes Towards Dairy Farming	0.11	0.04	0.16	0.15	0.16
Knowledge level About AI	0.49**	0.21	0.06	0.13	0.34**
Knowledge level about VACD	0.38**	0.16	-0.13	0.30**	0.23*
Knowledge level about FNGF	0.33**	0.16	0.07	0.27**	0.17
Knowledge level about CF	0.35**	0.58**	0.11	0.10	0.06
Overall knowledge level about DFT	0.48**	0.41**	0.07	0.26**	0.29**

*P<0.05 **P<0.01

'r' = Correlation coefficient
AI = Artificial Insemination
CF = Concentrates feeding
F-R = Farmer-Researcher
VACD = Vaccination against Contagious diseases
FNGF = Feeding nutritious green fodder
CDFT = Common dairy farming technologies
F-E = Farmer-Extension agent

Adoption of feeding nutritious green fodder: It is amply clear from Table 5 that out of a total 18 variables, only farmers? intra-system communication had positive and significant relationship with adoption of FNGF. It could be further noticed that all other remaining variables did not show any significant relationship with adoption of FNGF, indicating less importance attached to the diffusion of FNGF through research and linkage systems among farmers.

Adoption of concentrates feeding : Information input, Information output, availability of input facilities, knowledge level about CF and overall knowledge level about dairy farming technologies had positive and highly significant (P<0.01) relationship with adoption of CF. Results further indicates that F-E communication as well as family educational status had positive and significant relationship (P<0.05) with adoption of CF. All other remaining variables did not show any significant relationship with adoption of CF among farmers.

Overall adoption of dairy farming technologies: Information input, information output, farmers inter-system communication, F-R communication, F-E communication, education, availability of input, facilities, knowledge level about AI. VACD,FNGF,CF and overall knowledge level about dairy farming technologies had positive and highly significant relationship (P<0.01) with overall adoption behavior of farmers of DHT indicating higher and better the information input/output, communication activities or pattern, availability of input facilities and knowledge level about dairy farming technologies, higher and better the adoption of technologies. Results gives a picture that age had negative but highly significant relationship (P<0.01) with overall adoption behavior about dairy farming technologies, indicating that an increase in the age of farmers resulted in the decline of overall adoption of dairy farming technologies. Furthermore, family education status had positive and significant relationship (P<0.05) with overall adoption behavior of dairy farming technologies. All other remaining variables, including family size, land holding, herd size as well as attitudes towards dairy farming did not show any significant relationship with overall adoption behavior of dairy farming technologies among farmers. These results supported by *Singh et al. 2010.*

Table 6. Partial regression coefficient of adoption behavior of farmers on communication and personal variables

Variables	Partial regression coefficient
Information Input	0.087 ± 0.058
Information Output	0.056 ± 0.168
Farmers Intra-system Communication	-0.267 ± 0.204
F-R Communication	0.035 ± 0.150
F-E Communication	0.310** ± 0.099
Knowledge level about Dairy Farming Technologies	0.439** ± 0.118

F - Value =15.38 and R^2 =0.4025; ** P<0.01

Regression analysis of adoption of dairy farming technologies on communication variables: Positive and highly significant partial regression coefficient (P<0.01) of F-E communication and knowledge level about dairy farming technologies was found to have contributed to the increase of overall adoption of dairy farming technologies among farmers (Table 6). The R^2 value of 0,4025 with F value of 15.38 indicates its significance 0.01 level of probability and revealed that 40.25 percent variation in adoption of dairy farming technologies among farmers could be explained with the help of these six variables.

CONCLUSION

The results of this study indicate that livestock farmers in Rural Bangalore have been exposed to dairy farming technologies diffusion programs. A vast majority of the livestock owners fully adopted technologies; however, the level of correct technology adoption is far from desired. The lack of the adoption of veterinary and medication technologies is an indication that these services are not having significance role in extension programmers. So, it is recommend ensuring transfer of veterinary and medication technologies through extension programmes. Highly significant difference was observed in mean values of the overall adoption of dairy farming technologies between small and large farmers. Mean values of overall adoption of dairy farming technologies was found to be significantly higher amongst large farmers. So, it is recommend extending training, communication and transfer of technology programs to small farmers.

Information input, information output, farmers' intra-system communication, Farmer-researcher communication, farmer-extension agent communication, availability of input facilities and overall knowledge about dairy Farming technologies had positive and highly significant relationship with overall adoption level of farmers of dairy Farming technologies. So, it is recommended enhancing the dissemination of information and knowledge regarding dairy farming technologies. Ensuring relation between livestock farmers, researchers and communication agents and distribution of input facilities among livestock owners is highly recommended.

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