Adoption Gap and its Path Analysis in Feeding Practices of Dairy Animals

B.S. Meena[1], Jitendra Chauhan[2], T. Rajula Shanthy[3] and B.P. Singh[4]

2. Sr. Scientist, National Dairy Research Institute, Karnal, 2. Head (Agril. Ext.), RBS, College, Bichpuri, Agra,
3. Principal Scientist (Agril. Ext.), Sugarcane Breeding Institute (ICAR), Coimbatore, Tamil Nadu,
4. Principal, RB (PG) College, Agra

Corresponding author email: bmeena65@gmail.com

ABSTRACT

Extension system had played a crucial role in enhancing milk production of country which needs no further emphasis. However, there still exists a wide gap between the technology available with the research system and its' adoption at farmers' field particularly in the sphere of livestock feeding. Therefore, an effort was made to find out the adoption gap in feeding practices of dairy animals in Jhansi district of Bundelkhand. The data was collected from 240 farmers from eight villages in Jhansi district. It was found that about three fourth of the respondents were in medium category of adoption gap in relation to feeding practices of dairy animals. The extent of adoption gap was in relation to feeding practice of dairy animals was 56.53 percent in the study area. Ther highest adoption gap was observed in feeding of calves (67.37%) whereas the lowest gap was found in dry animal feeding (50.24%). Further, it was calculated that landless and marginal farmers had 61.50 and 59.83 per cent extent of adoption gap on feeding of pregnant animals. The results also revealed that the respondents had 50.24 per cent extent of adoption gap in relation to feeding practices of dry animals. The zero order correlation figures showed that six independent variables namely mass media exposure, localite source of information, cosmopolite source of information, risk orientation, attitude and knowledge were having significant relationship in negative direction with adoption gap. Thus, the technology dissemination system must be focused on these variables to minimize this gap.

Key Words*: Adoption gap; Dairy animals; Farmers; Feeding practices;*

India has emerged as the largest milk producer in the world (127.3 metric tonnes, 2011-12), but the productivity of dairy animals is still very low. The low average milk production by the Indian cattle and buffaloes (2.22 and 4.58 kg) can be attributed to several reasons. Inadequate nutrition is the one of the largest factor responsible for low milk production in animals of well-defined breeds. Nutrition, in general, remains the most critical constraint to increase animal productivity with the perpetual gap between demand and supply of digestible crude protein and total digestible nutrients. In rainfed areas like Bundelkhand, feeding systems are primarily based on grazing of animals on native pastures of low productivity, which are steadily deteriorating. Therefore, it is required that in the current scenario of feeding practices the use of good quality feeds and adoption of supplemental feeding in respect to energy, protein and crude protein would be beneficial to improve the nutritional status of the animals. The approach of 'utilize better' (improving the quality of present feed stuff), 'produce more' (increasing biomass production) and 'import' (bringing nutrient supplements) could be resorted to fill the nutritional gap and optimize milk production. *Yadaw and Sharma (2012)* reported that adoption gap is the highest in improved feeding (70.67%) of ruminants which is one of the reasons for hindering the production of ruminants in the country. Ruminants of this area receive part or most of the feed requirements through grazing on natural grasslands, the production potential of which may range from an exercise ground in dry season to good grazing during rainy season (*Meena, et al. 2009*).

The role of modern technology in enhancing milk production in the country needs no further emphasis. It has been very well testified in few pockets of the country where there was substantial increase in the milk yield

potential of the animals through the application of dairy production technologies. However, there still exists a wide gap between the technology available with the researchers and its' adoption in farmers' field particularly in the sphere of livestock feeding. The most common causes for the technological gap as stated by *Roy et al (2013)* are farmer's lethargy / indifference, inadequate / ineffective extension system, inadequate input supply, inadequate credit support and inadequate market infrastructure. Due to this gap, farmers are unable to provide a balanced diet to their animals resulting in low productivity of dairy cattle and buffaloes. Therefore, an effort was made to find out the adoption gap in feeding practices of dairy animals in Bundelkhand region.

METHODOLOGY

The study was conducted in Jhansi district of Bundelkhand region of Uttar Pradesh state. The district has been divided into eight strata based on animal production, milk production and forest cover. From each stratum, one village was selected randomly to represent each strata. Thirty respondents from different land holding categories were selected in each village by applying proportionate random sampling technique. Thus, 240 farmers were personally interviewed to get first hand information from the eight selected villages.

Adoption gap refers to the difference between the recommended package of feeding practices of dairy animals and the extent of adoption of the recommended feeding practices of dairy animals. This was measured with the help of the following formula:

$$\text{Adoption gap (\%)} = \frac{R.S. - E.S.}{R.S.} \times 100$$

Where

RS=Recommended practices score
E.S.= Extant of adoption score

The data were subjected to path analysis to identify the potent variables, which were influencing the adoption gap separately and also to study the channeling effects of these variables.

RESULTS AND DISCUSSION

Distribution of respondents according to adoption gap : A cursory look on Table 1 revealed that about 74.00 per cent of the respondents were in medium category of adoption gap as against 13.00 per cent of farmers in high and equal percentage in low categories. The mean percentage of adoption gap of feeding

Table 1. Distribution of respondents based on adoption gap (N= 240)

Category	No.	%	Mean	S.D.
Low (< 50.50)	32	13.33	58.28	7.45
Medium (50.50-66.00)	177	73.75		
High (> 66.00)	31	12.92		

practices of dairy animals was 58.28 per cent with the standard deviation was 7.45. It was observed that about 13 per cent respondents were in high adoption gap probably because of the inadequate knowledge and unfavorable attitude towards dairy farming in general and feeding practices of dairy animal in particular. The results of the study showed that the farmers had high adoption gap in feeding practices of dairy animals.

Extent of adoption gap of feeding practices of dairy animals: The information collected from the respondents was further analyzed to find out the extent of adoption in relation to feeding practices of dairy animals. The results are discussed here under:

Adoption gap in feeding calves : It was revealed from the Table 2 that there was 67.37 per cent of extent of adoption gap in feeding practices of calves. Further, it could be observed that less extent of adoption gap existed among the small farmers i.e. 64.58 per cent. Whereas landless farmers were having 66.00 per cent adoption gap in the calves' feeding practices. It was found that the respondents had high adoption gap on colostrum feeding and quantity of milk fed to newborn calves. The findings were justified as farmers were having less knowledge on this aspect.

Adoption gap in feeding heifers : A quick look at the results presented in Table 2 revealed that the farmers of the study area were having 51.75 per cent of extent of adoption gap on the feeding practices of heifers. Where as landless and small farmers were having 50.00 and 50.42 per cent extent of adoption gap but a high extent of adoption gap (54.08%) was observed among the farmers who had large land holdings.

These findings conclude that landless, small and marginal farmers were having less adoption gap as compared to large and medium farmers. During the investigation it was observed that landless and marginal farmers took heifers from medium and large farmers for due care and after calving, 50.0 per cent cost of that animal was paid by the owner of the heifer i.e. medium and large farmers to the caretaker. Due to this fact marginal and landless farmers were having less adoption gap.

Table 2. Extent of adoption gap on feeding practices of dairy animals (N= 240)

Farmers' Category	Calves	Heifer	Pregnant animals	Animals in milk	Dry animals	Pooled
Land less	66.00	50.00	61.50	60.92	57.67	59.22
Marginal	64.58	51.50	59.83	55.92	50.42	56.45
Small	65.58	50.42	55.00	52.08	47.67	54.15
Medium	73.17	52.92	59.58	54.33	47.25	57.45
Large	67.50	54.08	58.92	48.33	48.17	55.40
Pooled	67.37	51.78	58.97	54.32	50.24	56.53

Adoption gap in feeding of pregnant animals : A high adoption gap was observed in providing concentrate to advanced pregnant animals. Further, the data presented in Table 2 revealed that landless and marginal farmers had 61.50 and 59.83 per cent extent of adoption gap on feeding of pregnant animals, whereas, small farmers had 55.00 per cent adoption gap on this aspect. During the data collection it was observed that the small farmers concentrated their mind on care of advanced pregnant animals. Mostly stall feeding was adopted for feeding the pregnant animals only in the early morning and in late evening animals were allowed for grazing.

Adoption gap in feeding of animals in milk : It was interesting to observe that farmers had optimum adoption gap on the feeding of wet animals i.e. 53.33 per cent. It was clear from Table 2 that large and small farmers were having 48.33 and 52.08 per cent extent

of adoption gap in the feeding practices of animals in milk. It was also observed that landless and marginal farmers had 57.42 and 60.92 per cent extent of adoption gap about the feeding of these animals. As it is already explained in the feeding of heifers that, after calving, wet animals were taken back by the large farmers from the landless and marginal farmers. Hence, it was concluded that landless and marginal farmers had more adoption gap as well as less number of wet animals in their herd. Similar study conducted by *Kumar et al (2012)* stated that the adoption gap percentage in case of feeding was 72.39 per cent in unorganized farm as compared to organized farm where the adoption gap is 45.72 per cent. He further stated that the reason may be due to high percentage of people having marginal land holding and about 72.00 per cent of the dairy farmers are illiterate in the region. Additional to these information the adoption is effected by by the access to support mechanisms, viz. inputs, technical know-how, etc *(Bala et al., 2006).*

Adoption gap in feeding of dry animals : The results presented in Table 2 revealed that the respondents were having 50.24 per cent extent of adoption gap in relation to feeding practices of dry animals. Further, it was revealed that large farmers had the lowest adoption gap i.e. 45.25 per cent whereas; landless farmers had 57.67 per cent extent of adoption gap in the feeding of dry animals. It was

Table 3. Path analysis of independent variables with adoption gap on feeding practices of dairy animals (N=240)

Variables	'r' value	Direct effect	Indirect effect	Substantial indirect effect through single variable		
				I	II	III
Age (X_1)	-0.0803	-0.0337	-0.0466	-0.0616(X_{15})	0.01757 (X_7)	0.0169 (X_2)
Education (X_2)	-0.1518	-0.0807	-0.0711	-0.0855 (X_{15})	0.0240 (X_{10})	0.0168 (X_7)
Family education status (X_3)	-0.0860	-0.0006	-0.0854	-0.0406 (X_{15})	-0.0380 (X_2)	0.0151 (X_{10})
Family size (X_4)	0.0061	0.0231	-0.0170	-0.0331 (X_7)	-0.0137 (X_5)	-0.0105 (X_8)
Social participation (X_5)	-0.0377	-0.0627	0.0250	0.0403 (X_7)	-0.0156 (X_2)	0.0156 (X_{10})
Occupation (X_6)	-0.0359	-0.0040	-0.0319	-0.0227 (X_{15})	0.0209 (X_7)	-0.0167 (X_{10})
Land holding (X_7)	-0.0467	0.1136	-0.1603	-0.0745 (X_{15})	-0.0440 (X_8)	-0.0223 (X_5)
Herd size (X_8)	-0.1586	-0.0749	-0.0837	-0.1389 (X_{15})	0.0666(X_7)	-0.0121 (X_{12})
Milk production (X_9)	-0.1498	0.0177	-0.1675	-0.1495 (X_{15})	-0.0404 (X_8)	0.0327 (X_{10})
Mass media exposure (X_{10})	-0.4275**	0.1283	-0.5558	-0.4634 (X_{15})	-0.0408 (X_{11})	-0.0341 (X_{14})
Localite information source (X_{11})	-0.4994**	-0.0763	-0.4231	-0.4561 (X_{15})	0.0686 (X_{10})	-0.0355 (X_{14})
Cosmopolite information source (X_{12})	-0.2221*	-0.0804	-0.1417	-0.1341 (X_{15})	0.0262 (X_{10})	-0.0134 (X_{11})
Risk orientation (X_{13})	-0.6328**	0.0496	-0.6824	-0.6430 (X_{15})	0.0636 (X_{10})	-0.0446 (X_{14})
Attitude towards dairy farming (X_{14})	-0.6408**	-0.0638	-0.5770	-0.6165 (X_{15})	0.0685 (X_{10})	-0.0424 (X_{15})
Knowledge (X_{15})	-0.8470**	-0.8455	-0.0015	0.0703 (X_{10})	-0.0465 (X_{14})	0.0377 (X_{13})

* Significant at 5 percent level of probability   * *Significant at 1 percent level of probability

also observed during the course of investigation that farmers offered comparatively equal amount and type of feeding to their adult (wet and dry) animals.

On the whole, it could be stated that there was 56.53 per cent extent of adoption gap regarding feeding practices of dairy animals. Results indicated that the lowest (54.15%) extent of adoption gap existed among the small farmers where as the highest (59.22%) gap was observed among landless farmers in feeding practices of dairy animals. *Rathod et al (2011)* found that majority of farmers (87%) reported non availability of fodder round the year followed by inadequate knowledge about feeding (76%) as the major constraints in dairy farming.

Path analysis : The zero order correlation figures given in Table 3 showed that six independent variables namely mass media exposure, localite source of information, cosmopolite source of information, risk orientation, attitude and knowledge were having significant relationship in negative direction with the adoption gap. This analysis revealed if the value of the above mentioned variables increases the adoption gap will automatically decrease. Further, direct and indirect effect of each variable on adoption gap revealed that knowledge was the most potent one as it was found exerting maximum direct effect (-0.8455) in negative direction on the adoption gap. Next in order of importance was education, cosmopolite source of information, localite source of information, herd size and attitude towards dairy farming to have negative effects. It was logically true that with increase in knowledge, education, use of source of information, herd size and favourable attitude adoption gap could be minimized.

The variable 'risk orientation' had the highest (-0.6824) total indirect effect on adoption gap and it was routing through knowledge, mass media exposure and attitude towards dairy farming. Where as attitude towards dairy farming, mass media exposure and localite source of information were having total indirect effect (-0.5770), (-0.5558) and (-0.4231) on adoption gap respectively. Incidentally, knowledge was being used by as many as twelve variables in exercising their indirect influence. Whereas, mass media exposure and land holding were used by ten and six variables, respectively. The results indicated that these variables played a significant role in influencing adoption gap.

CONCLUSION

It could be concluded that there was 56.53 per cent extent of adoption gap regarding feeding practices of dairy animals. Results indicated that the lowest (54.15%) extent of adoption gap existed among the small farmers where as the highest (59.22%) gap was observed among landless farmers in feeding practices of dairy animals. Path analysis explains that knowledge, education, mass media exposure and land holding were very imperative variables for minimizing adoption gap. Thus, the technology dissemination system must be geared up to organize campaigns, field days, demonstrations, exhibitions, kisan gosthi, kisan mela, discussions with farmers, etc. so that farmers could acquire latest knowledge, that can lead to reduction in adoption gap in relation to feeding practices of dairy animals.

REFERENCES

Bala, Brij.; Sharma, S.D. and Sharma, R.K. (2006). Knowledge and adoption level of improved technology among rural women owing to extension programmes. *Agril. Econ.Res. Review*, **19**: 301-310.

Meena B.S.; Singh, A.K.; Chauhan Jitendra and Sankhala Gopal (2009). Farmers' knowledge on feeding practices of dairy animals in Jhansi district. *Indian Res. J. Ext. Edu.*, **9** (1) : 28-31.

Rathod., Prakash Kumar; Sariput Landge; T. R. Nikam and S. Vajreshwari (2011). Socio-personal profile and constraints of dairy farmers. *Karnataka J. Agric. Sci.,* **24** (4) : 619-621.

Roy, Deepa; Bandyopadhyay, AK.; and Ghosh, A. (2013). Identification of technological gap in pineapple cultivation in some selected areas of West Bengal. *Inl. J. of Sci., Envir. and Techno.*, **2** (3) : 442 – 448.

Kumar Upendra; Yadav, C.M. and Khan, P.M. (2012). Impact of adoption of certain selected improved animal husbandry practices in Sikar district of Rajasthan. *Agril. Res. and Reviews,* **1** (3) : 86 – 88.

Yadaw., K.N. and Sharma, M. L. (2012). Adoption and adoption gap of goat keepers towards recommended goat rearing practices. *Indian Res. J. Ext. Edu.,* **12** (2) : 77-80.

● ● ● ● ●