Contributory Influence of Training Intervention on Attitude Formation of Dairy Animal Owners towards Dairy Farming

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ABSTRACT

An attitude are not innate, it could be changed also by training intervention. In fact, favourable attitude of the farmer is an important pre-requisite to bring desirable changes in any farming enterprises. Over the years, with enhanced demand for improved agricultural and allied technologies, the number of trainings organized by Krishi Vigyan Kendras (Farm Science Centres) had grew substantially. In this context, the current study has undertaken in Indian state Maharashtra to ascertain the contributory influence of dairy farming trainings over the attitude of participants (90 trainees) toward dairy farming by comparing them with statistically formed control group of 90 un-trained dairy animal owners with application of propensity score matching method. Mann Whitney U test shows a significant difference in rank averages of attitude score of trained and untrained dairy animal owners. Pearson's correlation coefficients had showed highly significant association of variables like knowledge, entrepreneurial behaviour, economic motivation, mass media exposure, material possession, training participation, milk productivity, in-formal sources utilization with attitude of respondents towards dairy farming. While stepwise multiple regression by backward elimination, predicted family education status, material possession, informal sources of information, dairy herd size, annual family income, annual net income from dairying, entrepreneurial behaviour and knowledge as the most contributing factors towards attitude of respondents. The study showed desirable impact of training programme imparted by Krishi Vigyan Kendras on attitude of dairy animal owners. Hence, it is suggested that training organizing institutes should intensively organize more long duration trainings ensuring larger and wider participation of rural population.

Key word*s: Training; Attitude; Influence; Propensity score matching; Krishi Vigyan Kendra;*

A*llport (1935)* defined attitude as a mental state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related. Attitude refers to the degree of positive or negative affect associated with some psychological object (*Thurstone, 1946*). Attitudes are often acquired from other people through social learning, can be formed via subliminal conditioning - which occurs in the absence of conscious awareness of the stimuli involved – and mere exposure (*Baron and Branscombe, 2015*). Attitudes are not innate, but are formed – may be positively or negatively - as result of individual's contact with environment. Attitudes are prone to change. Changes in attitude may be brought about by training and, other instructional methods and aids (*Ray, 2011*).

The appropriate training of practicing farmers received the attention of various educational institutions in varying degrees. Being an important district level educational institute for practising farmers, rural youth and women – Krishi Vigyan Kendras (Farm Science Centres) – with its broad network (680 KVKs) - had spread across the country under different administrative host institutes. National Institute of Labour Economics Research and Development (an institute of NITI Aayog) reported that KVKs has an edge over other

organizations providing technology services. As per the annual reports (various issues) of Department of Agricultural Research and Education (DARE), during the last five years, KVKs in India had organized on an average 53,000 training courses for about 15 lack farmers, farm women and rural youths per annum. National Institute of Labour Economics Research and Development stated that on an average each KVK trained about 100 persons annually. The growth in number of trainings organized by KVKs over the years has been due to demand-driven factors, mainly due to increased demand for improved agricultural and allied technologies. Trainings of KVKs, aimed towards developing capability of participants in terms of knowledge, skill, attitude, adoption, consequently to improve productive performance of their farm and by large socio-economic upliftment. By and large attitude of farmers forms an essential component for the better implementation and success of KVK training programmes (*Dubey et al., 2008*). With this background, current study was carried out to evaluate influence of training intervention on attitude of trained dairy farmers towards dairy farming using propensity score matching and optimum regression model.

METHODOLOGY

The present *ex-post facto* study was conducted in the Indian state of Maharashtra. The state has a large network of KVKs (45 in number) spread across 36 districts. The reference period considered for this study was a three-year period (2011 to 2013). This reference period was selected keeping in mind that impact of any training takes at least a few years to be visible and as such assessment of very recent trainings imparted would probably not provide robust indicators of associated impact. At the same time, assessment of trainings conducted long back in time would probably result in recall errors on the part of respondents and thus provide biased results. Three KVKs, namely Sisa (Akola), Risod (Washim) and Pal (Jalgaon) were selected for the study as these KVKs had organized the highest number of long-duration (5 days or more) dairy farming trainings for dairy farmers during the reference period considered in the study. The lists of participants-in the trainings conducted during 2011-2013 were procured and 30 trained respondents, possessing at least one dairy animal, from each KVK were selected randomly. To generate

the comparison group, three villages from least intervened block under operational area of each KVK were selected purposively and 30 dairy animal owners from each of these villages, who never attended any training, were selected randomly from the list of dairy animal owners of each village. Thus, the ultimate sample size for the study comprised of 90 trained and 270 un-trained dairy animal owners. Data were collected from the selected households on farm - farmer specific characteristics and their attitude towards dairy farming.

The attitude of respondents towards dairy farming was measured with the help of scale developed by *Gupta et al. (1978)*. Statistical tools employed to analyze the data included mean, frequency, percentage, Mann Whitney U test (2-tailed), independent sample 't' test, Pearson's co-efficient correlation and multiple linear regression analysis.

Propensity score matching (PSM) method was used to avoid selection bias and build a statistical comparison group of un-trained comparable to trained dairy animal owners. The estimation procedure – pertaining to impact assessment - was conducted through two main steps. In the first step, the probability of participating in training was estimated through a formal logit regression model:
The Logit model used is of the form:

$$Ln\ (P_i\ /1\text{-}\ P_i) = \alpha +\ \beta_i X_i +\ D_i + ei$$

Where the left hand side represents the log of odds of participating in training and X is the vector of continuous independent variables and D is vector of dummy independent variables. Baseline covariates were selected as age, gender, category, marital status, family type, family size, child below the age 4 years, education and dairy farming experience. $\hat{a}_i$'s are the coefficients to be estimated which represent the change in the log of odds of participating in training in the model. A positive estimated coefficient implies an increase in the likelihood that a respondent will be a trainee.

In the second step, a matching method is selected to be used to match treatment and control group. Matching constructs an artificial comparison group by identifying for every possible observation under treatment a control observation (or set of control observations) that has the most similar characteristics possible. In PSM, the individual from the comparison group is chosen as a matching partner for a treated

individual that is closest in terms of propensity score (*Caliendo & Kopeinig, 2008*). Statistical Package for the Social Sciences (SPSS) and it's add-on PSM tool was used to find closest matches with trained dairy animal owners by applying logistic regression and calliper distance 0.11 and below to obtain exact 10 un-trained dairy animal owners from each village. Finally 90 un-trained dairy animal owners matched with 90 trained dairy animal owners - equally divided across all three KVKs - were considered in the study.

RESULTS AND DISCUSSION

Description of the respondents : Table 1 elicits that average age of the trained dairy animal owners was 43.98 years relatively lower with the average of non-trainees (44.78 years). Most of the respondents in both groups were male, married and belonged to either General/OBC/ SC category of caste with almost similar structure of family type with an average 5.97 members in trained respondents against slightly higher (6.33) members in family of untrained dairy animal owners. It further reveal that at least one child below 4 years of age were present in every two households' of respondent in both groups. The data shown in Table 1 further depicts that the most of the respondents had schooling either up to high school (8th to 10th class) or higher secondary school (11th to 12th class) with average 15.86 years experience of dairy farming in trained group, relatively lower than the average 16.71 years experience of un-trained group.

However, statistically trainee (treatment) and non-trainee (comparison) groups do not showed significant difference on selected covariates, which indicated that the all selected covariates are sufficiently matched after application of propensity score matching method.

Attitude of respondents towards dairy farming : A perusal of Table 2 shows that majority (71%) respondents each equally from both group had favourable attitude toward dairy farming, followed by less favourable (22%) and more favourable (7%) in un-trained dairy animal owners' group, while contrary to it, majority amongst trained dairy animal owners' group were followed by more favourable (17%) and less favourable (12%) attitude towards dairy farming. The findings of this study are in consonance with the findings of *Senthil Kumar et al. (2013), Khuman et al. (2014) and Ray et al. (2015)*, while it is contradicts with the findings of *Ansari (2013)* who found that after training intervention attitude of majority of the trainee farmers had shifted to most favourable category of attitude. Table 2, further reveals that around two-fold of trainee respondents i.e. 22.22 per cent un-trained dairy animal owners had less favourable attitude, while comparatively additional 10 per cent trainees (16.67%) against to non-trainees (6.67%) had more favourable attitude toward dairy farming.

Further, an examination of the findings in Table 2 shows that the rank average of trained dairy animal owners was 106.64, while the dairy animal owners in untrained group had a rank average of 74.36. The analysis had shown significant difference between the rank averages of the trained and untrained dairy animal owners' group (U=2597.5, z=-4.191, p= pd 0.001, r= -.31). Results indicates that the trainee dairy animal owners' group had more favourable attitude towards dairy farming compared to their peers untrained dairy animal owners' group.

Table 1. Description of respondents after matching (PSM) with selected covariates

Covariates	Code used	Trained dairy animal owners (n=90)		Un-trained dairy animal owners (n=90)		't' stat
		Mean	S.D.	Mean	S.D.	
Age	In years	43.98	10.53	44.78	10.61	-.508
Gender	Female-1, Male-2	1.98	0.15	1.98	0.15	-.000
Marital status	Married-1, Un-married-2	1.06	0.23	1.07	0.25	-.310
Caste category	Gen-1, OBC-2, SC-3,ST-4, NT-5	2.12	0.70	2.19	0.63	-.669
Family type	Nuclear-1, Joint=2	1.44	0.50	1.49	0.50	-.595
Family size	In unit head	5.97	2.11	6.33	2.16	-1.151
Child <age 4 years	In unit head	0.50	0.72	0.51	0.66	-.108
Education	Illiterate-0, Primary-3, Middle-4, HS -5, Higher Sec.-6, Degree-7	5.12	1.42	5.21	1.36	-.429
Dairy farming exp.	In years	15.86	9.74	16.71	9.71	-.590

Table 2. Distribution of respondents according to their attitude towards dairy farming

Attitude towards dairy farming	Trained dairy animal owners (n=90)	Un-trained dairy animal owners(n=90)	Pooled (N=180)	Mann Whitney U test	'z'
Less favourable(>9.57)	11(12.22)	20(22.22)	31(17.22)		
Favourable(9.57 to 14.09)	64(71.11)	64(71.11)	128(71.11)	2597.5	-4.191***
More favourable(<14.09)	15(16.67)	6(6.67)	21(11.67)		
Median	13	11	12		
Mean rank	106.64	74.36	—	r = -0.31	

Figures in parentheses indicates percentage, ***Significant at 0.001 level of probability

Correlation between independent variables and attitude : An examination of the findings in Table 3 shows that the independent variables like knowledge of dairy farming practices, entrepreneurial behaviour index, economic motivation, mass media exposure, material possession, training participation, milk productivity index and utilization of informal sources of information had highly significant (pd".01) correlation with attitude of respondents towards dairy farming, while social participation and extension agency contact had significant (pd" .05) correlation. Left over other selected variables *viz.* family education status, land holding, dairy herd size, annual family income and annual net income from dairying, employment generation in dairy farming, had shown non-significant but positive correlation with attitude. From this association, it could be inferred that dairy animal owners having higher level of knowledge of dairy farming practices, entrepreneurial behaviour, economic motivation, mass media exposure, material possession, training participation, milk productivity and utilization of informal sources of information changed their attitude with relatively more frequency than the dairy animal owners having its' lower level. This explanation hold good in the light of observations made by *Ansari (2013),* while it is contradicts with the findings of *Sharma (2014),* who reported negative correlation of herd size, milk production and mass media exposure with attitude level of dairy farm women during a study conducted to identify the correlates of change due to training programme in Chittoor district of Andhra Pradesh state.

Contributory influence of selected variables on attitude of respondents towards dairy farming : In order to assess the contribution of independent variables in formation of desirable attitude amongst the respondents towards dairy farming, multiple regression analysis was carried out and results are presented in Tables 4 and 5. In the first stage of multiple regression analysis, entire set of 16 independent variables (Table 4) was considered. The co-efficient of multiple

Table 3. Zero order correlation between selected independent variables and attitude of respondents towards dairy farming

Selected independent variables	(r)	Sig. (2-tailed)
Family education status	.099	.186
Material possession	.236**	.001
Mass media exposure	.238**	.001
Extension agency contact	.170*	.022
Informal sources of information	.205**	.006
Training participation	.269**	.000
Land holding	.039	.606
Dairy herd size	.083	.270
Employment generation in dairy farming	.102	.174
Milk productivity index	.212**	.004
Annual family income	.075	.319
Annual net income from dairying	.091	.224
Social participation	.179*	.016
Economic motivation	.444**	.000
Entrepreneurial behaviour index	.631**	.000
Knowledge of dairy farming practices	.651**	.000

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

determinations (R^2) was found to be 0.542 which was highly significant (d"0.001). This indicated that 54.20 per cent of variation in attitude of trained and un-trained dairy animal owners was due to the combined influence of 16 independent variables taken for the study. Table 4 further reveals that knowledge of dairy farming practices (d"0.001) and entrepreneurial behaviour index (d"0.01) of the respondents had highly significant regression co-efficient. The independent variables including material possession and annual net income from dairy farming had significant (d"0.05) positive regression co-efficient, while annual family income had negative regression co-efficient at 0.05 level of probability. It further reveals that family education status (0.320), mass media exposure (0.054), informal sources of information (0.215), training participation (0.077), employment

generation (0.002), milk productivity index (0.001), economic motivation (0.058) had non-significant but positive regression co-efficient, which reflected their contribution in formation of attitude.

Furthermore to identify set of independent variables contributing maximum attitude formation of the respondents towards dairy farming, the stepwise multiple regressions (Table 5) with backward elimination

procedure was carried out. As a result, out of sixteen variables, eight variables were identified as most contributing factors towards attitude of respondents. The results presented in Table 5 reveals that family education status, material possession; informal sources of information, dairy herd size, annual family income, annual net income from dairy farming, entrepreneurial behaviour index and knowledge about dairy farming practices

Table 4. Multiple linear regression analysis to determine the combined influence of selected independent variables on attitude of respondents towards dairy farming

Independent variables	Unstandardized Coefficients		Standardized Coefficients	't' value	Sig.
	β	S. E.	β		
(Constant)	(-.309)	(2.365)		(-.131)	(.896)
Family education status	.320	.180	.106	1.772	.078
Material possession	.117	.049	.247	2.370*	.019
Mass media exposure	.054	.060	.075	.908	.365
Extension agency contact	-.123	.093	-.093	-1.325	.187
Informal sources of information	.215	.114	.114	1.894	.060
Training participation	.077	.244	.020	.317	.752
Land holding	-.006	.029	-.018	-.203	.839
Dairy herd size	-.096	.055	-.283	-1.752	.082
Employment generation in dairy farming	.002	.003	.101	.824	.411
Milk productivity index	.001	.005	.018	.290	.772
Annual family income	-3.739	.000	-.385	-2.519*	.013
Annual net income from dairying	4.969	.000	.307	1.979*	.049
Social participation	-.001	.243	.000	-.003	.998
Economic motivation	.058	.079	.056	.739	.461
Entrepreneurial behaviour index	.053	.018	.284	3.002**	.003
Knowledge of dairy farming practices	.146	.033	.382	4.381***	.000

R^2 = .542, F = 12.033 (p=.000, df =16), Adjusted R^2 =.497, R square change = .542, (SE=1.604), F change =12.033 (p=.000)
*Significant at 0.05 level of probability, **Significant at 0.01 level of probability and ***Significant at 0.001 level of probability

Table 5. Optimum model of multiple regression analysis with independent variables of respondents and attitude towards dairy farming

Independent variables	Unstandardized Coefficients		Standardized Coefficients	't' value	Sig.
	β	S. E.	β		
(Constant)	(-.296)	(1.757)		(-.168)	(.866)
Family education status	.327	.169	.109	1.930	.055
Material possession	.115	.044	.242	2.601**	.010
Informal sources of information	.274	.104	.146	2.646**	.009
Dairy herd size	-.079	.041	-.234	-1.953	.052
Annual family income	-3.978	.000	-.410	-3.381***	.001
Annual net income from dairy	6.386	.000	.394	3.125**	.002
Entrepreneurial behaviour index	.057	.015	.304	3.787***	.000
Knowledge of dairy farming practices	.150	.031	.392	4.870***	.000

R^2 = .531, F = 24.183 (p=.000, df =8), Adjusted R^2 =.509, R square change = -.003, (SE=1.584), F change =1.052 (p=.307)
*Significant at 0.05 level of probability, **Significant at 0.01 level of probability, ***Significant at 0.001 level of probability

together were able to predict 53.10 per cent variability in attitude formation amongst trained and un-trained dairy animal owners. It was quite interesting to note that elimination of eight variables from regression model resulted into minor decreases in R2 value and that decrease was -0.003.

This particular result highlights the major contribution of all of eight variables viz. family education status (p=0.055), material possession (p=0.01), informal sources of information (p=0.009), annual net income from dairy farming (p=0.001), entrepreneurial behaviour index (p=0.000) and knowledge about dairy farming practices (p=0.000) with positive regression co-efficient, while it was negative in case of dairy herd size (p=0.052), and annual family income (p=0.001). The quantification of these contributory eight variables may serve as baseline for manipulating these variables to

change attitude of dairy animal owners favourably

changes in attitudes of the participants.

towards dairy farming.

CONCLUSION

With above findings, it can be concluded that training intervention of KVKs in the study area had significantly influenced attitude of trained dairy farmers favourably toward dairy farming, might be due to indirect effect of trainees' higher knowledge acquired through participation in training. Higher knowledge of trainees might have changed their entrepreneurial behaviour, economic motivation, employment, productivity, income and other associated variables. A combined effect of all these variables might be a reason that trainees' had more favourable attitude towards dairy farming compared to un-trained dairy animal owners in the study area. Hence, it is suggested that training organizing institutes like KVKs should intensively organize preferably long duration trainings ensuring larger and wider participation of population to bring desirable

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