Adoption behaviour of dairy farmers in relation to green fodder cultivation in a cooperative farming system

R. K. GHOSH, A. GOSWAMI & A. K. MAZUMDAR
Department of Veterinary & Animal Husbandry Extension Education, West Bengal University of Animal & Fishery Sciences, 68, K. B. Sarani, Belgachia, Kolkata-37, India

ABSTRACT

This study was carried out at purposively selected Gaighata and Bagdah blocks of the North-24-Parganas District, West Bengal, India. From each of the purposively selected two blocks, 25 per cent of the village-level milk cooperative societies were selected randomly. Thus, 10 village-level milk cooperative societies (25%) from Gaighata Block and 20 (25.64%) from Bagdah Block were randomly selected. From each of the selected milk cooperative societies, four dairy farmers were randomly selected, out of which both Member Cooperative Society (MCS) and Non-member Cooperative Society (NMCS) were two. Thus, 60 MCS and 60 NMCS (total of 120 respondents) were selected, which constituted the sample of this study. The direct face-to-face interview method with structured schedule was followed for data collection. The study showed that adoption of green fodder cultivation was highly correlated with all the socio-psychological variables in MCS and NMCS. It also showed that all the communication variables had significant correlation with adoption of green fodder cultivation in MCS and NMCS, excepting personal cosmopolite and personal localite in MCS. Among socio-economic variables, age had significant negative correlation with adoption of green fodder cultivation in MCS. On Path analysis, knowledge about green fodder feeding in MCS, concentrate feeding, and deworming in NMCS came out to be the key variables that directly and indirectly influenced the adoption of green fodder cultivation.

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RÉSUMÉ

GHOSH, R. K., GOSWAMI, A. & MAZUMDAR, A. K.: *Comportement d'adoption d'agriculteurs laitièrs envers la culture de fourrage vert dans un système d'agriculture coopérative*. L'étude actuelle était faite à des endroits Gaighata et Bagdah choisis délibérément de district Pargana 24-North, L'ouest Bengal Inde. De chaque endroit de deux blocs choisis délibérément 25 pour cent (approximative) des Sociétés Coopératives pour le lait au niveau du village, étaient sélectionnées au hasard. De cette façon 10 Sociétés Coopératives Laitières au niveau du village (25 pour cent) d'endroit de bloc Gaighata et 20 (25.64 pour cent) d'endroits de bloc Bagdah étaient choisis au hasard. De chaque société coopérative laitière choisie, quatre agriculteurs laitièrs étaient choisies au hasard dequelle la Société Coopérative Membre (SCM) et la Société Coopérative Non-membre (SCMN) étaient deux en nombre. De cette facon, 60 de la Société Coopérative Membre et 60 de la Société Coopérative Non-membre (120 personnes interrogées aux totaux) étaient choisis, ce qui constitue l'échantillon de l'étude actuelle. La méthode d'interrogation face à face avec un programme structuré était suivi pour l'objet de recueille des données. L'étude révélait que l'adoption de la culture de fourrage vert est hautement corrélée avec tous les variables socio-psycologiques en SCM et SCMN. Il révélait également que tous les variables de communication avaient des corrélations considérables avec l'adoption de culture de fourrage vert en SCM et SCMN excepté le cosmopolite personnel et le localite personnel en SCM. Parmi les variables socio-économiques, l'âge avait une corrélation négative considérable avec l'adoption de la culture de fourrage vert en SCM. Après les analyses au laboratoire, les connaissances de l'alimentation de fourrage vert en SCM les connaissances de l'alimentation avec le concentré et les connaissances de soin contre les vers en SCMN se présentment comme les variables-clés qui influencent directement et indirectement l'adoption de la culture de fourrage vert.

Introduction

Adoption of any improved technology involves a process in which awareness is created, attitudes are changed, and favourable conditions for adoption are provided. According to Wilkening (1953), adoption is deciding and acting over a period. How latest is the knowledge of a dairy producer about various AH practices such as breeding, feeding and management of milch animals determine largely the success or failure of a dairy enterprise. In this context, milk co-operatives have ambitious objectives. They do not only want to increase the productivity of milch animals, but also wish to raise the economic status of rural people at large through increased economic milk production. For economic milk production, adopting green fodder cultivation and feeding is crucial. It can minimize the production cost to a greater extent.

At the same time, the adoption behaviour of dairy farmers depends on education, knowledge, attitude, risk orientation, and innovation proneness (Bhople & Thakare, 1994; Kunzru & Tripathi, 1994). Sadamate *et al.* (1982) reported that only 29.88 per cent of respondents adopted improved fodder production practices. Meena & Malik (1999) reported that knowledge about green fodder cultivation was highly significant with the adoption of improved fodder cultivation practices. Nataraju & Channegowda (1984) concluded that there should be training and demonstration programmes, campaigns and others to encourage the cultivation of green fodder in dry land, because the dairy farmers lack knowledge about green fodder cultivation.

Considering this theoretical back-up, the study was undertaken to determine the correlation between socio-economic, socio-psychological and communication characteristics of the dairy farmers and adoption of green fodder cultivation, and also to find out the key variables that influence the adoption of green fodder cultivation.

Materials and methods

Considering the need for availability of data and the usual limitations of a student research project, the Gaighata and Bagdah blocks of the North-24-Parganas District in West Bengal, India, were purposively selected for this study. From each of the two purposively selected blocks, 25 per cent of the village-level milk cooperative societies were selected randomly. Thus, 10 village-level milk cooperative societies (25%) from Gaighata Block and 20 (25.64%) from Bagdah Block were selected randomly. Therefore, a total of 30 village-level milk cooperative societies were selected for this study. From each of the selected milk cooperative societies, four dairy farmers were randomly selected, out of which both Member Cooperative Society (MCS) and Non-member Cooperative Society (NMCS) were two. Thus, 60 MCS and 60 NMCS (total of 120 respondents) were selected, which constituted the sample of this study. Before the final data collection, a pilot study was carried out and, accordingly, the construction and sequence of interview schedule were changed as appropriate. The schedule was then finalized and duplicated. Data were collected through face-to-face interview by the researcher. In this study, adoption was measured by the adoption index method developed by Dasgupta (1968).

Results and discussion

The Pearson correlation coefficients for the association between adoption of green fodder cultivation and the independent variables (selected socio-economic, socio-psychological and communication variables) were calculated for the two categories of dairy farmers (MCS and NMCS). Table 1 summarises the results.

Socio-economic variables

Table 1 shows that adoption of green fodder cultivation by the dairy farmers was negatively and significantly correlated with age, and positively and significantly correlated with

TABLE 1

Zero Order Correlation Between Adoption of Green Fodder Cultivation and Independent Variables

Independent variable	*Coefficient of correlation (γ) values*	
	Member cooperative society (N = 60)	*Non-member cooperative society (N = 60)*
Socio-economic variables		
Age	-0.538**	-0.208
Occupation	0.346**	-0.041
Caste	0.351**	-0.169
Education of the respondent	0.352**	0.327*
Family educational status	0.312*	0.325*
Family type	-0.138	-0.104
Family size	-0.112	-0.166
Land holding	0.340**	0.283*
House type	0.481**	0.014
Farm power	-0.237	0.046
Material possession	0.103	0.138
Economic status	0.366**	0.217
Socio-psychological variables		
Innovation proneness	0.464**	0.632**
Attitude toward dairy farming	0.563**	0.570**
Risk orientation	0.503**	0.569**
Knowledge level about artificial insemination	0.471**	0.539**
Knowledge level about deworming	0.406**	0.659**
Knowledge level about feeding of green fodder	0.867**	0.622**
Knowledge level about feeding of concentrates	0.609**	0.750**
Communication variables		
Mass media communication	0.323*	0.303*
Personal cosmopolite	0.206	0.516**
Personal localite	0.210	0.258*
Communication sources	0.310*	0.481**
Urban contact	0.347**	0.438**

NB * indicates $P<0.05$, ** indicates $P<0.01$

family educational status, education of the respondent, occupation, caste, land holding, and house type in dairy farmers of MCS. For NMCS, adoption of green fodder cultivation by the dairy farmers was positively and significantly correlated with education of the respondent, family educational status, and land.

The adoption of green fodder cultivation by the dairy farmers was not significantly correlated with family type, family size, farm power, and material possession for both.

Socio-psychological variables

Table 1 shows that adoption of green fodder cultivation by the dairy farmers was positively and significantly correlated with all the socio-

psychological variables, *viz*. innovation proneness, attitude toward dairy farming, risk orientation, knowledge about AI, deworming, feeding of green fodder, and feeding of concentrates for MCS and NMCS.

Communication variables

Table 1 shows that adoption of green fodder cultivation by the dairy farmers of MCS was found to be positively and significantly correlated with variables like mass media communication, communication source, and urban contact. But for NMCS, adoption of green fodder cultivation by the dairy farmers was positively and significantly correlated with mass media communication, personal localite, personal cosmopolite, communication source, and urban contact.

Path analysis on the basis of relationship between adoption of green fodder cultivation and the exogenous variables

The results of Path analysis (Table 2) for Member Cooperative Society represent the direct and indirect effects for 24 selected exogenous variables on adoption of green fodder cultivation.

Table 2 shows that knowledge about green fodder feeding has the largest direct effect (0.642) on adoption of green fodder cultivation for dairy farmers of MCS, followed in descending order by land holding (0.336), attitude toward dairy farming (0.202), mass media communication (0.181), utilization of personal localite sources (0.180), house type (0.174), innovation proneness (0.120), caste (0.115), knowledge about deworming (0.109), material possession (0.092), utilization of personal cosmopolite (0.086), family size (0.085), occupation (0.064), economic status (0.027), education of the respondent (-0.007), family educational status (-0.012), risk orientation (-0.018), age (-0.049), farm power (-0.063), knowledge about AI (-0.067), knowledge about concentrate feeding (-0.107), urban contact (-0.155), family type (-0.250), and utilization of communication source (-0.640).

The residual effect has been found to be 0.3884; or, in a way, 38.84 per cent of the total variabilities have been left unexplained.

Further processing of the data showed that out of 24 exogenous variables, 17 had their largest indirect effects through knowledge about green fodder feeding, which are occupation, caste, education of the respondent, family educational status, land holding, house type, innovation proneness, attitude toward dairy farming, risk orientation, knowledge about AI, deworming and concentrate feeding, mass media communication, personal cosmopolite, personal localite, communication source, and urban contact. Three variables, *viz.* age, family type and family size, exert their largest indirect effect through communication source. Similarly, land holding steers two variables, *viz*. farm power and economic status. Material possession and knowledge about green fodder feeding had their largest indirect effect through mass media communication and attitude toward dairy farming, respectively.

The findings suggest that knowledge about green fodder feeding does not only exert the largest direct effect on adoption of green fodder cultivation, but several factors also exert their largest indirect effect through it. So knowledge about green fodder feeding has come out to be the key element, which directly and indirectly promotes the adoption of green fodder cultivation for dairy farmers of MCS.

Table 3 shows the results of Path analysis for NMCS. Knowledge about deworming (0.723) had the largest direct effect on adoption of green fodder cultivation for dairy farmers of NMCS, followed in descending order by knowledge about concentrate feeding (0.714), economic status (0.512), mass media communication (0.435), personal cosmopolite (0.419), education of the respondent (0.387), risk orientation (0.279), personal localite (0.259), age (0.226), innovation proneness (0.201), land holding (0.150), knowledge about green fodder feeding (0.122), attitude toward dairy farming (0.084), family size

TABLE 2

Path Coefficient Showing Direct and Indirect Effects of Selected Independent Variables on Adoption of Green Fodder Cultivation in Member Cooperative Society

Independent variable	*Direct effect on adoption of green fodder cultivation*	*Indirect effect on adoption of green fodder cultivation through other independent variables*	
(X_1) Age	-0.049	X_{23}	0.244
		X_{19}	0.081
		X_{24}	0.054
(X_2) Occupation	0.064	X_{18}	0.214
		X_{14}	0.050
		X_3	0.028
(X_3) Caste	0.115	X_{18}	0.295
		X_{20}	0.055
		X_9	0.028
(X_4) Education of respondents	-0.007	X_{18}	0.237
		X_9	0.081
		X_{20}	0.077
(X_5) Family educational status	-0.012	X_{18}	0.191
		X_8	0.100
		X_9	0.093
(X_6) Family type	-0.250	X_{23}	0.162
		X_7	0.072
		X_8	0.057
(X_7) Family size	0.085	X_{23}	0.166
		X_{24}	0.035
		X_8	0.016
(X_8) Land holding	0.336	X_{18}	0.116
		X_9	0.077
		X_{22}	0.055
(X_9) House type	0.174	X_{18}	0.240
		X_8	0.148
		X_{20}	0.099
(X_{10}) Farm power	-0.063	X_8	0.071
		X_{19}	0.051
		X_{23}	0.024
(X_{11}) Material possession	0.092	X_{20}	0.068
		X_9	0.053
		X_{18}	0.048
(X_{12}) Economic status	0.027	X_8	0.254
		X_{18}	0.178
		X_{20}	0.091
(X_{13}) Innovation proneness	0.120	X_{18}	0.270
		X_{14}	0.124
		X_{17}	0.073
(X_{14}) Attitude toward dairy farming	0.202	X_{18}	0.324
		X_{13}	0.123
		X_{20}	0.090
(X_{15}) Risk orientation	-0.018	X_{18}	0.353
		X_{14}	0.140
		X_{13}	0.115
(X_{16}) Knowledge about AI	-0.067	X_{18}	0.264
		X_{13}	0.144
		X_{14}	0.143

TABLE 2 (continued)

Independent variable	*Direct effect on adoption of green fodder cultivation*	*Indirect effect on adoption of green fodder cultivation through other independent variables*	
(X_{17}) Knowledge about deworming	0.109	X_{18}	0.250
		X_{13}	0.135
		X_{14}	0.105
(X_{18}) Knowledge about green fodder feeding	0.642	X_{14}	0.102
		X_{13}	0.084
		X_{20}	0.066
(X_{19}) Knowledge about concentrate feeding	-0.107	X_{18}	0.405
		X_{13}	0.138
		X_{14}	0.124
(X_{20}) Mass media utilization	0.181	X_{18}	0.241
		X_{14}	0.100
		X_{8}	0.092
(X_{21}) Utilization of personal cosmopolite sources	0.086	X_{18}	0.154
		X_{14}	0.119
		X_{20}	0.110
(X_{22}) Utilization of personal localite sources	0.180	X_{18}	0.116
		X_{8}	0.103
		X_{14}	0.091
(X_{23}) Utilization of communication sources	-0.640	X_{18}	0.222
		X_{20}	0.162
		X_{22}	0.125
(X_{24}) Urban contact	-0.155	X_{18}	0.246
		X_{8}	0.141
		X_{22}	0.116

(0.075), occupation (0.048), family type (0.046), caste (-0.036), family educational status (-0.088), material possession (-0.173), knowledge about AI (-0.277), urban contact (-0.290), farm power (-0.290), house type (-0.308), and communication sources (-1.033).

The residual effect has been found to be 0.4121; or, in a way, 41.21 per cent of the total variabilities have been left unexplained.

Further processing of the data shows that out of 24 exogenous variables, 14 had their largest indirect effect through knowledge about concentrate feeding, which are education of the respondents, family educational status, economic status, innovation proneness, attitude toward dairy farming, risk orientation, knowledge about AI, deworming and green fodder feeding, mass media communication, personal cosmopolite, personal localite, communication source, and urban contact. Similarly, four variables had their largest indirect effect through communication source, which are age, occupation, caste, and family size. Economic status steers four variables, *viz.* land, house type, farm power, and material possession. Family type and knowledge about concentrate feeding exert their largest indirect effect on adoption of green fodder cultivation through house type and personal cosmopolite

TABLE 3

Path Coefficient Showing Direct and Indirect Effects of Selected Independent Variables on Adoption of Green Fodder Cultivation in Non-member Cooperative Society

Independent variable	*Direct effect on adoption of green fodder cultivation*	*Indirect effect on adoption of green fodder cultivation through other independent variables*	
(X_1) Age	0.226	X_{23}	0.515
		X_{24}	0.126
		X_{16}	0.118
(X_2) Occupation	0.048	X_{23}	0.082
		X_{24}	0.053
		X_{12}	0.039
(X_3) Caste	-0.036	X_{23}	0.094
		X_4	0.058
		X_{16}	0.025
(X_4) Education of respondents	0.387	X_{19}	0.242
		X_{21}	0.182
		X_{20}	0.154
(X_5) Family educational status	-0.088	X_{19}	0.333
		X_4	0.187
		X_{21}	0.164
(X_6) Family type	0.046	X_9	0.057
		X_{21}	0.056
		X_7	0.052
(X_7) Family size	0.075	X_{23}	0.107
		X_{12}	0.050
		X_6	0.031
(X_8) Land holding	0.150	X_{12}	0.349
		X_{19}	0.090
		X_{15}	0.078
(X_9) House type	-0.308	X_{12}	0.388
		X_4	0.090
		X_{20}	0.079
(X_{10}) Farm power	-0.290	X_{12}	0.188
		X_{21}	0.145
		X_{19}	0.122
(X_{11}) Material possession	-0.173	X_{12}	0.362
		X_{19}	0.220
		X_{21}	0.201
(X_{12}) Economic status	0.512	X_{19}	0.193
		X_{21}	0.184
		X_4	0.115
(X_{13}) Innovation proneness	0.201	X_{19}	0.518
		X_{20}	0.247
		X_{21}	0.204
(X_{14}) Attitude toward dairy farming	0.084	X_{19}	0.522
		X_{21}	0.279
		X_{20}	0.230
(X_{15}) Risk orientation	0.279	X_{19}	0.463
		X_{21}	0.229
		X_4	0.139
(X_{16}) Knowledge about AI	-0.277	X_{19}	0.534
		X_{21}	0.228
		X_{20}	0.183

TABLE 3 (continued)

Independent variable	*Direct effect on adoption of green fodder cultivation*	*Indirect effect on adoption of green fodder cultivation through other independent variables*	
(X_{17}) Knowledge about deworming	0.723	X_{19}	0.553
		X_{21}	0.247
		X_{15}	0.202
(X_{18}) Knowledge about green fodder feeding	0.122	X_{19}	0.475
		X_{20}	0.224
		X_{21}	0.208
(X_{19}) Knowledge about concentrate feeding	0.714	X_{21}	0.312
		X_{15}	0.181
		X_{13}	0.145
(X_{20}) Mass media utilization	0.435	X_{19}	0.181
		X_{4}	0.136
		X_{21}	0.126
(X_{21}) Utilization of personal cosmopolite sources	0.419	X_{19}	0.538
		X_{12}	0.227
		X_{4}	0.170
(X_{22}) Utilization of personal localite sources	0.259	X_{19}	0.328
		X_{21}	0.196
		X_{12}	0.171
(X_{23}) Utilization of communication sources	-1.033	X_{19}	0.471
		X_{21}	0.342
		X_{20}	0.305
(X_{24}) Urban contact	-0.290	X_{19}	0.440
		X_{21}	0.315
		X_{12}	0.238

sources, respectively.

The findings suggest that though knowledge about deworming has the largest direct effect on adoption of green fodder cultivation, 14 factors exert their largest indirect effect through knowledge about concentrate feeding. Table 3 clearly shows that the extent of total effect (direct and indirect) through knowledge about concentrate feeding is significantly higher than that through knowledge about deworming. So knowledge about concentrate feeding has come out to be the key element that directly and indirectly promotes the adoption of green fodder cultivation for dairy farmers of NMCS. Knowledge about deworming has come out to be the second most important variable that influences the adoption of green fodder cultivation by the dairy farmers of NMCS.

Conclusion

Knowledge about green fodder feeding is the key variable that directly and indirectly influences the adoption of green fodder cultivation in Member Cooperative Society, whereas knowledge about concentrate feeding and deworming are the two main factors that influence the adoption of green fodder cultivation, directly and indirectly, in Non-member Cooperative Society.

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